

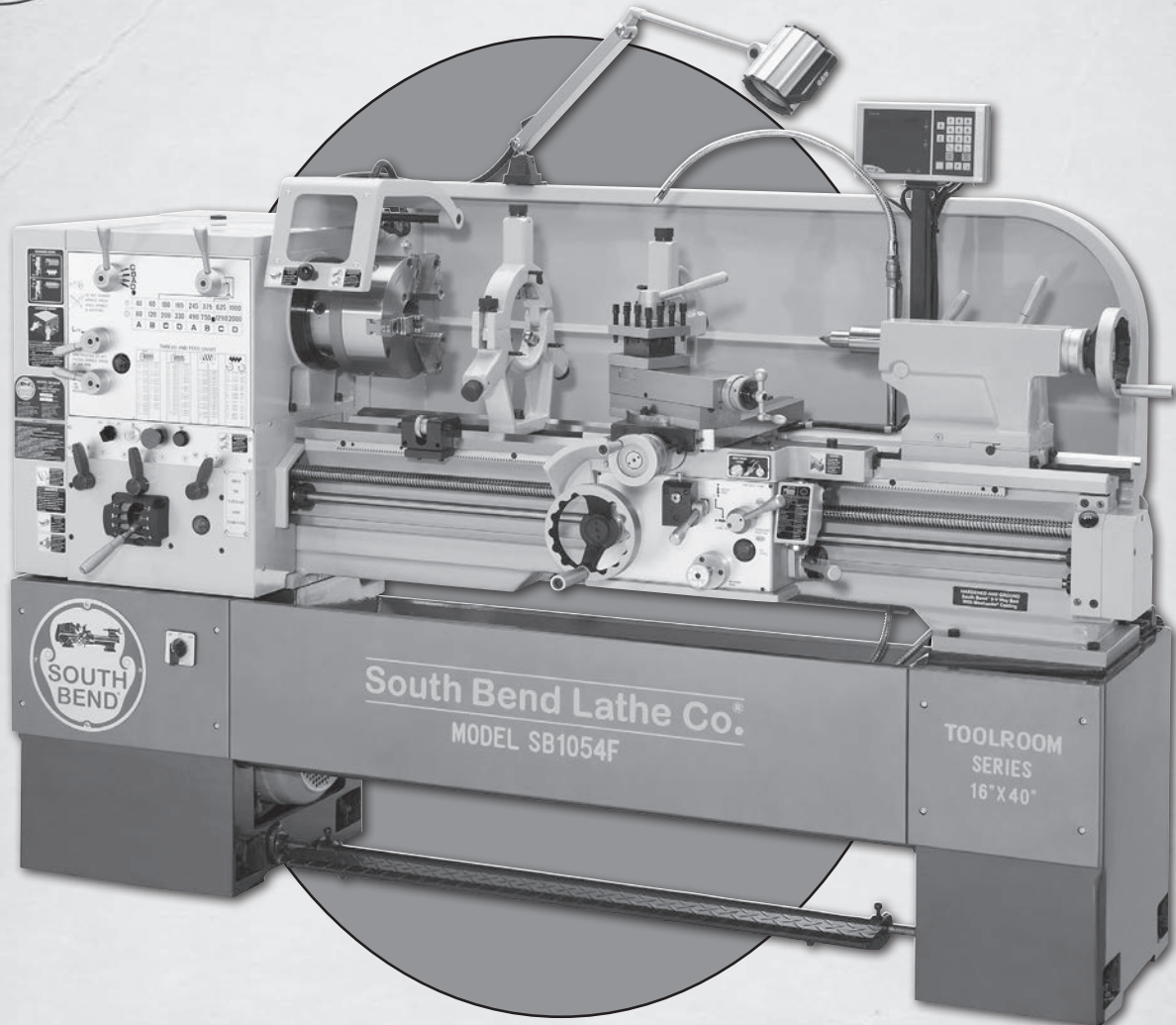


# 16 SPEED GEARHEAD LATHE

MODEL SB1053 14" X 40"

MODEL SB1054F 16" X 40" w/DRO

MODEL SB1055F 16" X 60" w/DRO



**OWNER'S MANUAL**

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## South Bend Lathe Co.<sup>®</sup>

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*Hundreds of Thousands of Lathes Sold With a Tradition of Quality Since 1906!*



# Scope of Manual

This manual helps the reader understand the machine, how to prepare it for operation, how to control it during operation, and how to keep it in good working condition. We assume the reader has a basic understanding of how to operate this type of machine, but that the reader is not familiar with the controls and adjustments of this specific model. As with all machinery of this nature, learning the nuances of operation is a process that happens through training and experience. If you are not an experienced operator of this type of machinery, read through this entire manual, then learn more from an experienced operator, schooling, or research before attempting operations. Following this advice will help you avoid serious personal injury and get the best results from your work.

# Manual Feedback

We've made every effort to be accurate when documenting this machine. However, errors sometimes happen or the machine design changes after the documentation process—so the manual may not exactly match your machine. If a difference between the manual and machine leaves you in doubt, contact our customer service for clarification.

We highly value customer feedback on our manuals. If you have a moment, please share your experience using this manual. What did you like about it? Is there anything you would change to make it better? Did it meet your expectations for clarity, professionalism, and ease-of-use?

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# Updates

For your convenience, any updates to this manual will be available to download free of charge through our website at:

**[www.southbendlathe.com](http://www.southbendlathe.com)**

# Customer Service

We stand behind our machines. If you have any service questions, parts requests or general questions about your purchase, feel free to contact us.

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# About This Machine

## Foreword

*"The screw cutting engine lathe is the oldest and most important of machine tools and from it all other machine tools have been developed. It was the lathe that made possible the building of the steamboat, the locomotive, the electric motor, the automobile and all kinds of machinery used in industry. Without the lathe our great industrial progress of the last century would have been impossible."* —**How To Run a Lathe**, 15th Edition, South Bend Lathe.

The lathe represented in this manual is a modern day version of the screw cutting lathes that trace their roots back to the 1700's, which were themselves technological improvements of the bow lathe that can be traced back thousands of years to the ancient Egyptians.

Now, almost 300 years later, these modern "screw cutting" lathes are not just a piece of refined machinery, but a culmination of human ingenuity and knowledge embodied into the design and synergy of thousands of interworking parts—some of which represent the life's work and dreams of many inventors, mechanical engineers, and world-class machinists—including the likes of Leonardo da Vinci, Henry Maudsley, and the founders of South Bend Lathe, John and Miles O'Brien.

And now the torch is passed to you—to take the oldest and most important type of machine tool—and carry on the tradition. As the operator of a South Bend Lathe, you now join the ranks of some very famous and important customers, such as Henry Ford, who used the machines he purchased to help him change the world.

## Capabilities

This 16-Speed Toolroom Lathe is built for daily use in a busy industrial setting. Loaded with many nice features and high-precision parts, this lathe excels at making fine tools, dies, thread gauges, jigs, and precision test gauges—however, it is by no means delicate. Thick castings, heavy weight, and quality construction throughout provide the necessary brawn for demanding production and manufacturing tasks.

## Features

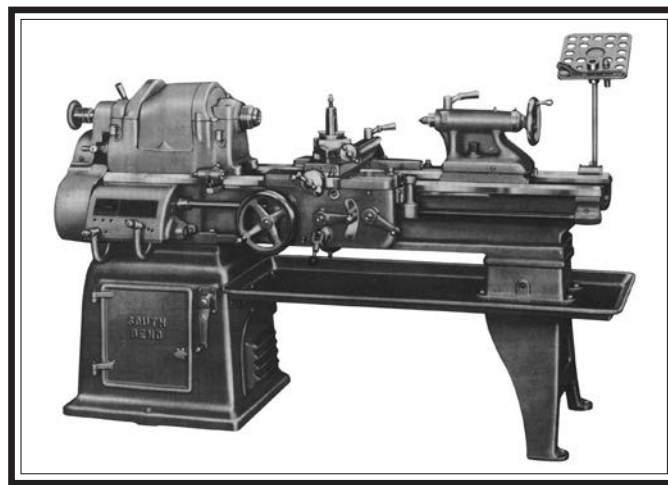
This 16-Speed Gearhead Lathe is packed with standard features and equipment, such as a complete coolant system, easy-to-clean chip drawer, one-shot way lubrication system, included steady and follow rests, chuck guard, adjustable work lamp, foot brake, powered cross feed, 3- and 4-jaw chucks, and faceplate. Models SB1054F and SB1055F also feature a Fagor 2-axis 20iT DRO.

Spindle speeds are controlled by a 2-speed motor and convenient headstock levers, which allow the operator to quickly set the spindle speed within the available range of 40–2000 RPM.

Bed ways are constructed with Meehanite castings that are precision hardened and ground in the traditional 3-V prismatic design—long used on South Bend Lathes for accuracy, durability, and rigidity.

Headstock features quick-change gear controls and an adjustable clutch mechanism that can be set to disable the feed rod to prevent crash damage. Spindle is a D1-6 (camlock type) with an MT#6 taper and 2 $\frac{1}{16}$ " bore. Tailstock quill has an MT#4 taper and offers 6" of travel.

Finally, to ensure long-lasting accuracy in the most demanding shops, the spindle is equipped with Japanese NTN bearings.



16" South Bend Precision Toolroom Lathe  
(Circa 1958)

# General Identification

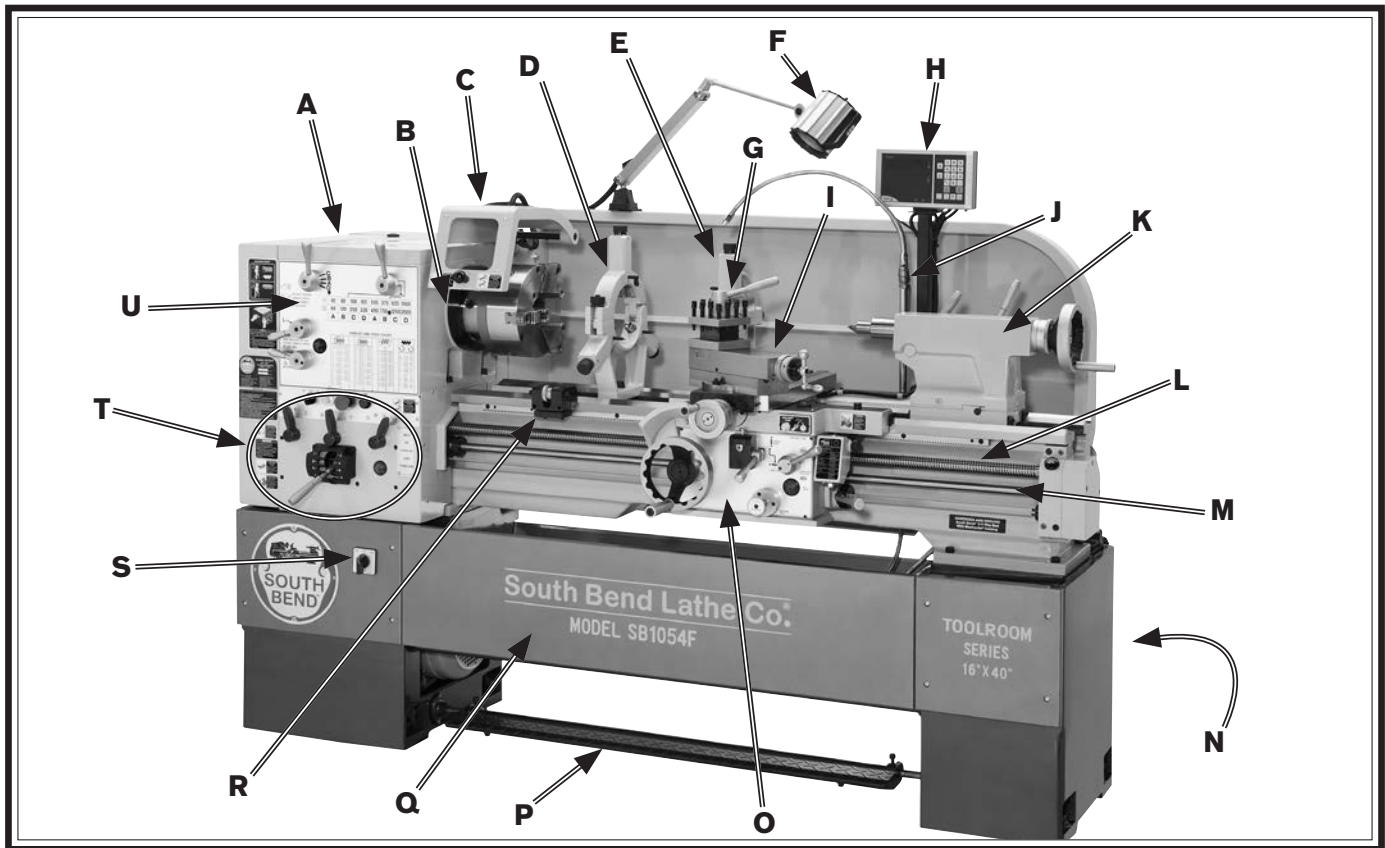


Figure 1. General identification (Model SB1054F shown).

- |   |   |
|---|---|
| <b>A.</b> Headstock                                 | <b>K.</b> Tailstock                     |
| <b>B.</b> D1-6 Camlock MT#6 Spindle                 | <b>L.</b> Longitudinal Leadscrew        |
| <b>C.</b> Chuck Guard w/Safety Switch               | <b>M.</b> Feed Rod                      |
| <b>D.</b> Steady Rest                               | <b>N.</b> Coolant Tank & Pump Access    |
| <b>E.</b> Follow Rest                               | <b>O.</b> Carriage                      |
| <b>F.</b> Halogen Work Lamp                         | <b>P.</b> Brake Pedal                   |
| <b>G.</b> 4-Way Tool Post                           | <b>Q.</b> Chip Drawer                   |
| <b>H.</b> Fagor 2-Axis DRO (SB1054F & SB1055F only) | <b>R.</b> Micrometer Stop               |
| <b>I.</b> Compound Rest                             | <b>S.</b> Spindle Motor 2-Speed Switch  |
| <b>J.</b> Coolant Nozzle & Valve                    | <b>T.</b> Quick-Change Gearbox Controls |
|   | <b>U.</b> Headstock Controls            |

## ⚠ WARNING

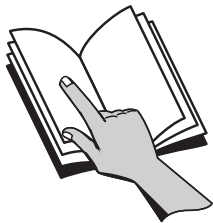
Serious personal injury could occur if you connect the machine to power before completing the setup process. **DO NOT** connect power until instructed to do so later in this manual.

## ⚠ WARNING

Untrained users have an increased risk of seriously injuring themselves with this machine. **Do not operate this machine until you have understood this entire manual and received proper training.**

# Controls & Components

Refer to **Figures 2–9** and the following descriptions to become familiar with the features and basic controls of this lathe. This knowledge will be necessary to properly set up the lathe for the test run and spindle break-in.

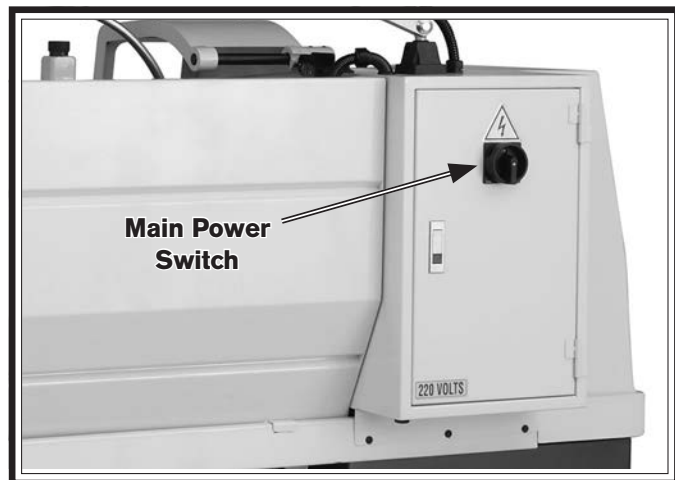


**⚠ WARNING**

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any lathe operations.

## Master Power Switch

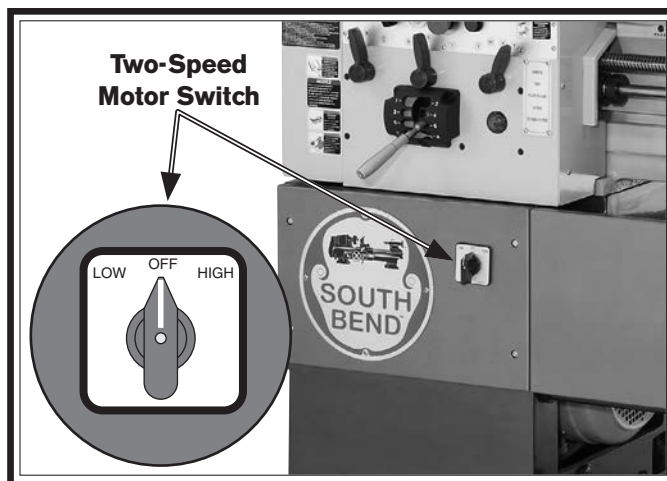
The master power switch enables power to all lathe electrical controls.



**Figure 2.** Location of the master power switch.

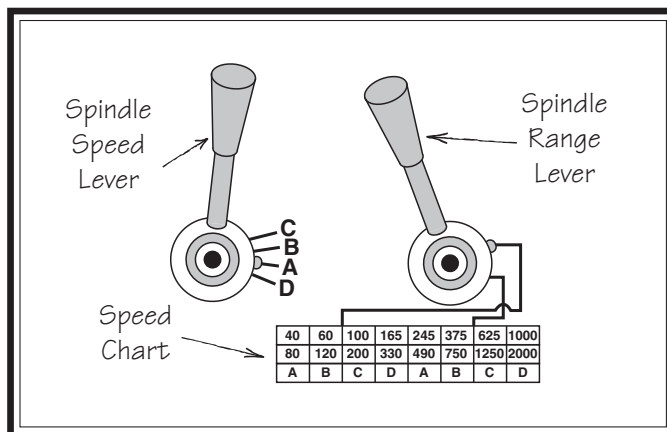
## Two-Speed Motor Switch

One of three controls used to select spindle speed. Select LOW or HIGH motor speeds, which represent the top or bottom row of speed available on the spindle speed chart (see **Figure 4**).



**Figure 3.** Location of two-speed motor switch.

## Spindle Speed Levers & Chart



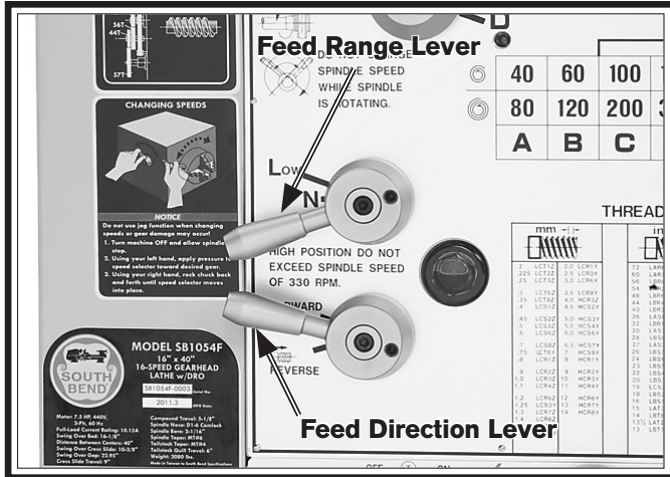
**Figure 4.** Spindle speed chart.

**Spindle Speed Lever:** One of three controls used to select spindle speed. Selects A, B, C, or D gear position on the spindle speed chart.

**Spindle Range Lever:** One of three controls used to select spindle speed. Selects low or high range of spindle speeds on the spindle speed chart (low range is on the left, high range is on the right).

**Spindle Speed Chart:** Displays the position of the two-speed motor switch, spindle speed lever, and spindle range lever required to achieve each of the 16 available spindle speeds.

**Feed Controls**

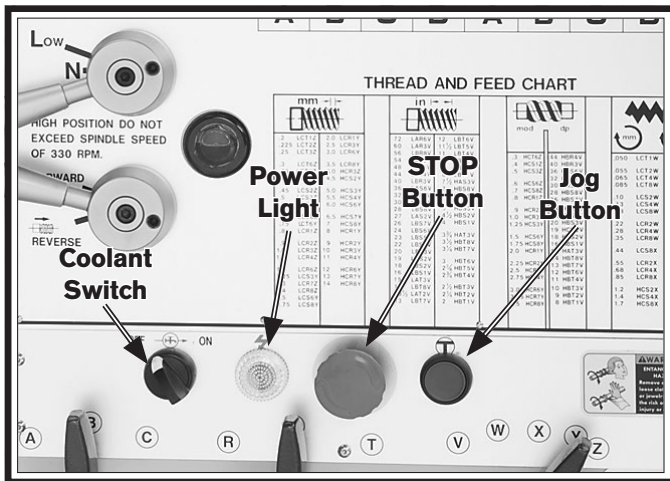


**Figure 5. Feed controls on headstock.**

**Feed Range Lever:** Shifts the quick-change gearbox into low range, neutral, or high range.

**Feed Direction Lever:** Controls the direction of the leadscrew or feed rod.

**Control Panel**



**Figure 6. Control panel.**

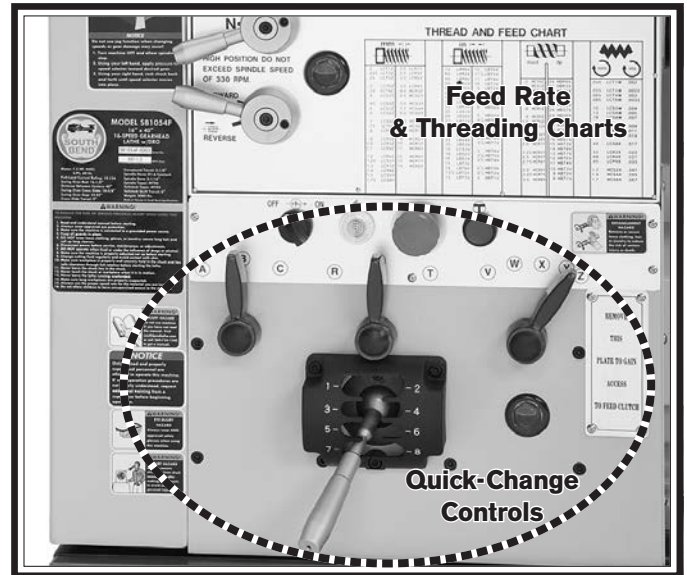
**Coolant Switch:** Starts and stops the coolant pump. Fluid flow is controlled by the valve on the coolant nozzle.

**Power Light:** Illuminates when power is enabled to all lathe electrical controls.

**STOP Button:** Cuts power to the spindle motor and coolant pump.

**Jog Button:** Turns spindle motor *ON* when being pressed.

**Quick-Change Gearbox Controls**



**Figure 7. Quick-change controls.**

**Quick-Change Gearbox Controls:** Set the quick-change gearbox configuration for feeding and threading operations.



## Carriage Controls

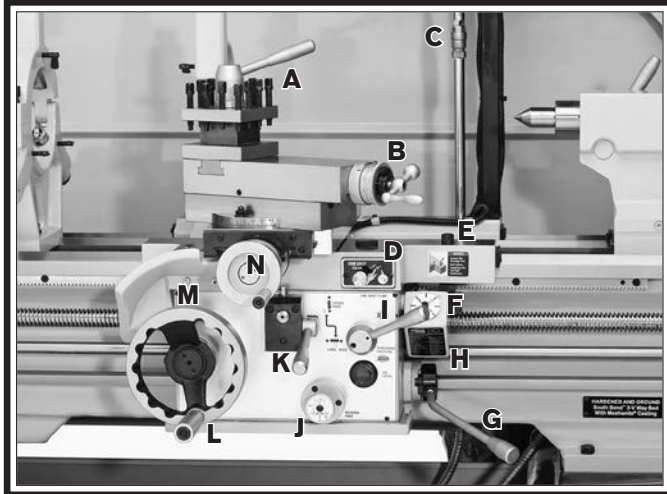


Figure 8. Carriage controls.

- A. 4-Position Tool Post Lever:** Locks the tool holder in four possible positions.
- B. Compound Rest Handwheel:** Moves the cutting tool back and forth relative to the workpiece. Includes an indirect-read graduated dial, which represents actual tool movement.
- C. Coolant Valve Lever:** Controls the flow of coolant from the nozzle.
- D. One-Shot Oiler:** Draws oil from the apron reservoir and lubricates the bed ways underneath the saddle.
- E. Carriage Lock Bolt:** Secures the carriage in place for greater rigidity and accuracy when using the cross slide or compound rest for machining operations.
- F. Thread Dial:** Indicates when to engage the half nut during inch threading operations.
- G. Spindle ON/OFF Lever:** Starts, stops and reverses direction of spindle rotation.
- H. Thread Dial Chart:** For each inch thread, displays which number on the thread dial to engage the half nut.
- I. Half Nut Lever:** Engages and disengages the half nut for threading operations.
- J. Quick-Change Feed Direction Knob:** Changes direction of carriage feed or the cross slide feed without having to stop the lathe and move the headstock feed direction lever.
- K. Feed Control Lever:** Engages and disengages the cross slide or carriage feed.
- L. Carriage Handwheel:** Moves the carriage manually along the bed.
- M. Apron:** Houses the carriage gearing and controls.
- N. Cross Slide Handwheel:** Moves the cross slide toward or away from the workpiece. Includes a direct-read graduated dial, which represents half the amount of tool movement and the total amount of material removed from the diameter of the workpiece.

## Tailstock Controls

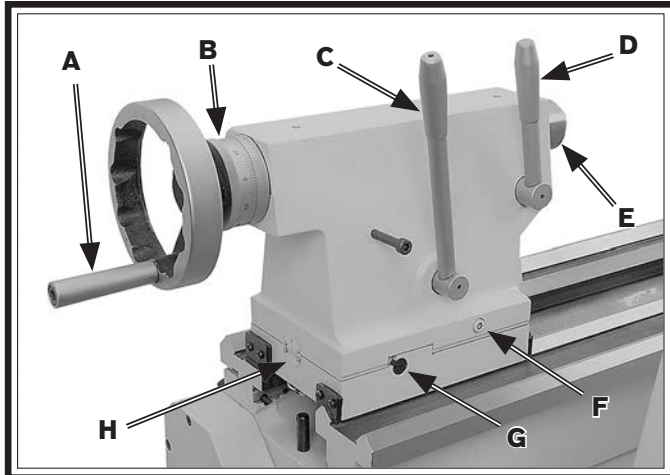


Figure 9. Tailstock controls.

- A. Tailstock Handwheel:** Moves the quill toward or away from the spindle.
- B. Graduated Scale:** Indicates quill movement in increments of 0.001". One full rotation of handwheel is 0.100".
- C. Tailstock Lock Lever:** Secures the tailstock in place along the bedway.
- D. Quill Lock Lever:** Locks the quill in position.
- E. Quill:** Holds centers or tooling with an MT#4 taper. Moves toward and away from the spindle.
- F. Tailstock Offset Screw:** Adjusts and secures the tailstock offset (1 of 2).
- G. Gib Adjustment Screw:** Adjusts the tailstock gib that controls side-to-side movement (1 of 2).
- H. Offset Scale:** Indicates the distance of tailstock offset from the spindle centerline. The scale increments are arbitrary.

## Foot Brake

This lathe is equipped with a foot brake (see **Figure 10**) to quickly stop the spindle instead of allowing it to coast to a stop on its own. Pushing the foot brake while the spindle is **ON** also cuts power to the motor.

After the foot brake is used, the spindle ON/OFF lever must be returned to the OFF (middle) position to reset the spindle switches, which will enable spindle rotation.

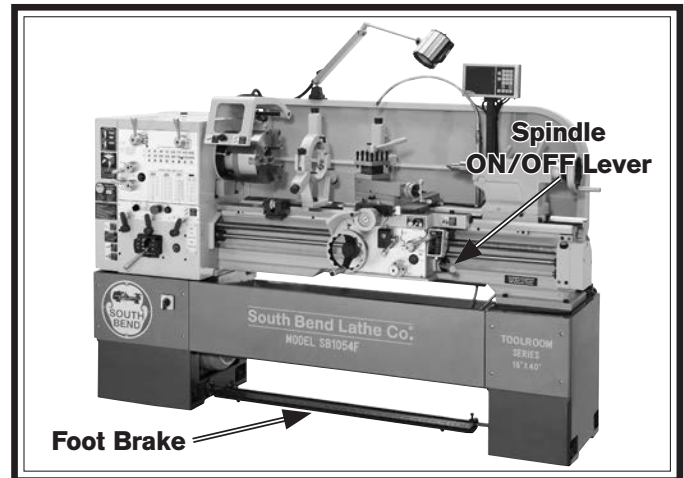


Figure 10. Foot brake and spindle ON/OFF lever.



# Product Specifications

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[www.southbendlathe.com](http://www.southbendlathe.com)



## MODEL SB1053, SB1054F, SB1055F 16 SPEED GEARHEAD LATHES

| Model Number                                      | SB1053                                  | SB1054F                               | SB1055F                               |
|---|---|---------------------------------------|---------------------------------------|
| <b>Product Dimensions</b>                         |   |                                       |                                       |
| Weight  | 2970 lbs.                               | 3080 lbs.                             | 3300 lbs.                             |
| Width (side-to-side)/Depth (front-to-back)/Height | 86 x 32-3/4 x 48 in.                    | 86 x 32-3/4 x 49 in.                  | 105-1/2 x 32-3/4 x 49 in.             |
| Foot Print (Width/Depth)                          | 82 x 19-1/2 in.                         | 82 x 19-1/2 in.                       | 102 x 19-1/2 in.                      |
| <b>Shipping Dimensions</b>                        |   |                                       |                                       |
| Type  | Wood Slat Crate                         | Wood Slat Crate                       | Wood Slat Crate                       |
| Weight  | 3234 lbs.                               | 3344 lbs.                             | 3652 lbs.                             |
| Width (side-to-side)/Depth (front-to-back)/Height | 94 x 44 x 69 in.                        | 94 x 45 x 69 in.                      | 109 x 45 x 69 in.                     |
| <b>Electrical</b>                                 |   |                                       |                                       |
| Power Requirement                                 | 220V, 3-Phase, 60 Hz                    | 440V, 3-Phase, 60 Hz                  | 440V, 3-Phase, 60 Hz                  |
| Full-Load Current Rating                          | 18.3A at 850 RPM,<br>20.15A at 1725 RPM | 10.15A                                | 10.23A                                |
| Minimum Circuit Size                              | 30A                                     | 15A                                   | 15A                                   |
| Switch  | Magnetic with Thermal Protection        | Magnetic with Thermal Protection      | Magnetic with Thermal Protection      |
| Switch Voltage                                    | 220V                                    | 440V                                  | 440V                                  |
| Plug Included                                     | No                                      | No                                    | No                                    |
| Recommended Plug/Outlet Type                      | NEMA L15-30                             | Hardwire to Locking Disconnect Switch | Hardwire to Locking Disconnect Switch |

| <b>Model Number</b>          | <b>SB1053</b>                   | <b>SB1054F</b>                 | <b>SB1055F</b>                 |
|------------------------------|---------------------------------|--------------------------------|--------------------------------|
| <b>Main Motor</b>            |                                 |                                |                                |
| Type                         | TEFC Induction                  | TEFC Induction                 | TEFC Induction                 |
| Horsepower                   | 7.5 HP                          | 7.5 HP                         | 7.5 HP                         |
| Voltage                      | 220V                            | 440V                           | 440V                           |
| Phase                        | 3-Phase                         | 3-Phase                        | 3-Phase                        |
| Amps                         | 18A at 850 RPM, 20A at 1725 RPM | 10A at 1725 RPM, 9A at 850 RPM | 10A at 1725 RPM, 9A at 850 RPM |
| Speed                        | 850/1725 RPM                    | 1720/850 RPM                   | 1720/850 RPM                   |
| Cycle                        | 60 Hz                           | 60 Hz                          | 60 Hz                          |
| Power Transfer               | V-Belt & Gear                   | V-Belt & Gear                  | V-Belt & Gear                  |
| Bearings                     | Shielded & Permanently Sealed   | Shielded & Permanently Sealed  | Shielded & Permanently Sealed  |
| <b>Coolant Motor</b>         |                                 |                                |                                |
| Type                         | TEFC Induction                  | TEFC Induction                 | TEFC Induction                 |
| Horsepower                   | 1/8 HP                          | 1/8 HP                         | 1/8 HP                         |
| Voltage                      | 220V                            | 440V                           | 440V                           |
| Phase                        | 3-Phase                         | 3-Phase                        | 3-Phase                        |
| Amps                         | 0.3A                            | 0.15A                          | 0.23A                          |
| Speed                        | 3450 RPM                        | 3450 RPM                       | 3450 RPM                       |
| Cycle                        | 60 Hz                           | 60 Hz                          | 60 Hz                          |
| Power Transfer               | Direct Drive                    | Direct Drive                   | Direct Drive                   |
| Bearings                     | Shielded & Permanently Sealed   | Shielded & Permanently Sealed  | Shielded & Permanently Sealed  |
| <b>Operation Information</b> |                                 |                                |                                |
| Swing Over Bed               | 14.17 in.                       | 16-1/8 in.                     | 16-1/8 in.                     |
| Distance Between Centers     | 40 in.                          | 40 in.                         | 60 in.                         |
| Swing Over Cross Slide       | 8.42 in.                        | 10.375 in.                     | 10.375 in.                     |
| Swing Over Saddle            | 13.75 in.                       | 15.75 in.                      | 15.75 in.                      |
| Swing Over Gap               | 20.98 in.                       | 22.95 in.                      | 22.95 in.                      |
| Maximum Tool Bit Size        | 3/4 in.                         | 3/4 in.                        | 3/4 in.                        |
| Compound Travel              | 5.12 in.                        | 5.1 in.                        | 5.1 in.                        |
| Carriage Travel              | 38.58 in.                       | 38.58 in.                      | 54 in.                         |
| Cross Slide Travel           | 9 in.                           | 9 in.                          | 9 in.                          |

| <b>Model Number</b>          | <b>SB1053</b>          | <b>SB1054F</b>         | <b>SB1055F</b>         |
|------------------------------|------------------------|------------------------|------------------------|
| <b>Headstock Information</b> |                        |                        |                        |
| Spindle Bore                 | 2.06 in.               | 2-1/16 in.             | 2-1/16 in.             |
| Spindle Taper                | MT#6                   | MT#6                   | MT#6                   |
| Number of Spindle Speeds     | 16                     | 16                     | 16                     |
| Range of Spindle Speeds      | 40 – 2000 RPM          | 40 – 2000 RPM          | 40 – 2000 RPM          |
| Spindle Type                 | D1-6 Camlock           | D1-6 Camlock           | D1-6 Camlock           |
| Spindle Bearings             | NTN Tapered Roller     | NTN Tapered Roller     | NTN Tapered Roller     |
| <b>Tailstock Information</b> |                        |                        |                        |
| Tailstock Quill Travel       | 6 in.                  | 6 in.                  | 6 in.                  |
| Tailstock Taper              | MT#4                   | MT#4                   | MT#4                   |
| Tailstock Barrel Diameter    | 2.047 in.              | 2.047 in.              | 2.047 in.              |
| <b>Threading Information</b> |                        |                        |                        |
| Number of Longitudinal Feeds | 17                     | 17                     | 17                     |
| Range of Longitudinal Feeds  | 0.002 – 0.067 in./rev. | 0.002 – 0.067 in./rev. | 0.002 – 0.067 in./rev. |
| Number of Cross Feeds        | 17                     | 17                     | 17                     |
| Range of Cross Feeds         | 0.001 – 0.034 in./rev. | 0.001 – 0.034 in./rev. | 0.001 – 0.034 in./rev. |
| Number of Inch Threads       | 45                     | 45                     | 45                     |
| Range of Inch Threads        | 2 – 72 TPI             | 2 – 72 TPI             | 2 – 72 TPI             |
| Number of Metric Threads     | 39                     | 39                     | 39                     |
| Range of Metric Threads      | 0.2 – 14 mm            | 0.2 – 14 mm            | 0.2 – 14 mm            |
| Number of Modular Pitches    | 18                     | 18                     | 18                     |
| Range of Modular Pitches     | 0.3 – 3.5 MP           | 0.3 – 3.5 MP           | 0.3 – 3.5 MP           |
| Number of Diametral Pitches  | 21                     | 21                     | 21                     |
| Range of Diametral Pitches   | 8 – 44 DP              | 8 – 44 DP              | 8 – 44 DP              |
| <b>Dimensions</b>            |                        |                        |                        |
| Bed Width                    | 10-1/4 in.             | 10-1/4 in.             | 10-1/4 in.             |
| Leadscrew Diameter           | 1-1/8 in.              | 1-1/8 in.              | 1-1/8 in.              |
| Leadscrew TPI                | 4 TPI                  | 4 TPI                  | 4 TPI                  |
| Leadscrew Length             | 63.58 in.              | 63.58 in.              | 83.58 in.              |
| Steady Rest Capacity         | 5/16 – 4-5/16 in.      | 5/16 – 4-5/16 in.      | 5/16 – 4-5/16 in.      |
| Follow Rest Capacity         | 5/8 – 3-1/8 in.        | 5/8 – 3-1/8 in.        | 5/8 – 3-1/8 in.        |
| Faceplate Size               | 12 in.                 | 12 in.                 | 12 in.                 |
| Feed Rod Diameter            | 3/4 in.                | 3/4 in.                | 3/4 in.                |
| Floor to Center Height       | 42 in.                 | 43-1/2 in.             | 43-1/2 in.             |
| Height With Leveling Jacks   | 43-1/2 in.             | 44-1/2 in.             | 44-1/2 in.             |

| <b>Model Number</b>    | <b>SB1053</b>                                   | <b>SB1054F</b>                               | <b>SB1055F</b>                               |
|------------------------|---|--|--|
| <b>Construction</b>    |   |  |  |
| Headstock              | Cast Iron                                       | Cast Iron                                    | Cast Iron                                    |
| Headstock Gears        | Flame-Hardened Steel                            | Flame-Hardened Steel                         | Flame-Hardened Steel                         |
| Bed                    | Meehanite Castings with Induction-Hardened Ways | Induction-Hardened Ways                      | Induction-Hardened Ways                      |
| Stand                  | Cast Iron                                       | Cast Iron                                    | Cast Iron                                    |
| Paint                  | Urethane  | Urethane                                     | Urethane                                     |
| <b>Other</b>           |   |  |  |
| Country of Origin      | Taiwan (Some Components Made in USA & Japan)    | Taiwan (Some Components Made in USA & Japan) | Taiwan (Some Components Made in USA & Japan) |
| Warranty               | 1 Year  | 1 Year                                       | 1 Year                                       |
| Serial Number Location | ID Label on Rear Side of Left Stand             | ID Label on Rear Side of Left Stand          | ID Label on Rear Side of Left Stand          |
| Assembly Time          | Approximately 1 Hour                            | Approximately 1 Hour                         | Approximately 1 Hour                         |




# Understanding Risks of Machinery

Operating all machinery and machining equipment can be dangerous or relatively safe depending on how it is installed and maintained, and the operator's experience, common sense, risk awareness, working conditions, and use of personal protective equipment (safety glasses, respirators, etc.).

The owner of this machinery or equipment is ultimately responsible for its safe use. This responsibility includes proper installation in a safe environment, personnel training and usage authorization, regular inspection and maintenance, manual availability and comprehension, application of safety devices, integrity of cutting tools or accessories, and the usage of approved personal protective equipment by all operators and bystanders.

The manufacturer of this machinery or equipment will not be held liable for injury or property damage from negligence, improper training, machine modifications, or misuse. Failure to read, understand, and follow the manual and safety labels may result in serious personal injury, including amputation, broken bones, electrocution, or death.

The signals used in this manual to identify hazard levels are as follows:

|  |  |  |  |
|--|--|--|--|
|  <b>DANGER</b>  | <i>Death or catastrophic harm WILL occur.</i>  |  <b>CAUTION</b> | <i>Moderate injury or fire MAY occur.</i>    |
|  <b>WARNING</b> | <i>Death or catastrophic harm COULD occur.</i> | <b>NOTICE</b>  | <i>Machine or property damage may occur.</i> |

## Basic Machine Safety

**Owner's Manual:** All machinery and machining equipment presents serious injury hazards to untrained users. To reduce the risk of injury, anyone who uses THIS item **MUST** read and understand this entire manual before starting.

**Personal Protective Equipment:** Operating or servicing this item may expose the user to flying debris, dust, smoke, dangerous chemicals, or loud noises. These hazards can result in eye injury, blindness, long-term respiratory damage, poisoning, cancer, reproductive harm or hearing loss. Reduce your risks from these hazards by wearing approved eye protection, respirator, gloves, or hearing protection.

**Trained/Supervised Operators Only:** Untrained users can seriously injure themselves or bystanders. Only allow trained and properly supervised personnel to operate this item. Make sure safe operation instructions are clearly understood. If electrically powered, use padlocks and master switches, and remove start switch keys to prevent unauthorized use or accidental starting.

**Guards/Covers:** Accidental contact with moving parts during operation may cause severe entanglement, impact, cutting, or crushing injuries. Reduce this risk by keeping any included guards/covers/doors installed, fully functional, and positioned for maximum protection.

**Entanglement:** Loose clothing, gloves, neckties, jewelry or long hair may get caught in moving parts, causing entanglement, amputation, crushing, or strangulation. Reduce this risk by removing/securing these items so they cannot contact moving parts.

**Mental Alertness:** Operating this item with reduced mental alertness increases the risk of accidental injury. Do not let a temporary influence or distraction lead to a permanent disability! Never operate when under the influence of drugs/alcohol, when tired, or otherwise distracted.

**Safe Environment:** Operating electrically powered equipment in a wet environment may result in electrocution; operating near highly flammable materials may result in a fire or explosion. Only operate this item in a dry location that is free from flammable materials.

**Electrical Connection:** With electrically powered equipment, improper connections to the power source may result in electrocution or fire. Always adhere to all electrical requirements and applicable codes when connecting to the power source. Have all work inspected by a qualified electrician to minimize risk.

**Disconnect Power:** Adjusting or servicing electrically powered equipment while it is connected to the power source greatly increases the risk of injury from accidental startup. Always disconnect power **BEFORE** any service or adjustments, including changing blades or other tooling.

**Secure Workpiece/Tooling:** Loose workpieces, cutting tools, or rotating spindles can become dangerous projectiles if not secured or if they hit another object during operation. Reduce the risk of this hazard by verifying that all fastening devices are properly secured and items attached to spindles have enough clearance to safely rotate.

**Chuck Keys or Adjusting Tools:** Tools used to adjust spindles, chucks, or any moving/rotating parts will become dangerous projectiles if left in place when the machine is started. Reduce this risk by developing the habit of always removing these tools immediately after using them.

**Work Area:** Clutter and dark shadows increase the risks of accidental injury. Only operate this item in a clean, non-glaring, and well-lighted work area.

**Properly Functioning Equipment:** Poorly maintained, damaged, or malfunctioning equipment has higher risks of causing serious personal injury compared to those that are properly maintained. To reduce this risk, always maintain this item to the highest standards and promptly repair/service a damaged or malfunctioning component. Always follow the maintenance instructions included in this documentation.

**Unattended Operation:** Electrically powered equipment that is left unattended while running cannot be controlled and is dangerous to bystanders. Always turn the power **OFF** before walking away.

**Health Hazards:** Certain cutting fluids and lubricants, or dust/smoke created when cutting, may contain chemicals known to the State of California to cause cancer, respiratory problems, birth defects, or other reproductive harm. Minimize exposure to these chemicals by wearing approved personal protective equipment and operating in a well ventilated area.

**Difficult Operations:** Attempting difficult operations with which you are unfamiliar increases the risk of injury. If you experience difficulties performing the intended operation, **STOP!** Seek an alternative method to accomplish the same task, ask a qualified expert how the operation should be performed, or contact our Technical Support for assistance.



# Additional Metal Lathe Safety

**Clearing Chips.** Metal chips can easily cut bare skin—even through a piece of cloth. Avoid clearing chips by hand or with a rag. Use a brush or vacuum to clear metal chips.

**Chuck Key Safety.** A chuck key left in the chuck can become a deadly projectile when the spindle is started. Always remove the chuck key after using it. Develop a habit of not taking your hand off of a chuck key unless it is away from the machine.

**Tool Selection.** Cutting with an incorrect or dull tool increases the risk of accidental injury due to the extra force required for the operation, which increases risk of breaking or dislodging components that can cause small shards of metal to become dangerous projectiles. Always select the right cutter for the job and make sure it is sharp. A correct, sharp tool decreases strain and provides a better finish.

**Securing Workpiece.** An improperly secured workpiece can fly off the lathe spindle with deadly force, which can result in a severe impact injury. Make sure the workpiece is properly secured in the chuck or faceplate before starting the lathe.

**Chucks.** Chucks are very heavy and difficult to grasp, which can lead to crushed fingers or hands if mishandled. Get assistance when handling chucks to reduce this risk. Protect your hands and the precision-ground ways by using a chuck cradle or piece of plywood over the ways of the lathe when servicing chucks.

**Safe Clearances.** Workpieces that crash into other components on the lathe may throw dangerous projectiles in all directions, leading to impact injury and damaged equipment. Before starting the spindle, make sure the workpiece has adequate clearance by hand-rotating it through its entire range of motion. Also, check the tool and tool post clearance, chuck clearance, and saddle clearance.

**Speed Rates.** Operating the lathe at the wrong speed can cause nearby parts to break or the workpiece to come loose, which will result in dangerous projectiles that could cause severe impact injuries. Large or non-concentric workpieces must be turned at slow speeds. Always use the appropriate feed and speed rates.

**Stopping Spindle by Hand.** Stopping the spindle by putting your hand on the workpiece or chuck creates an extreme risk of entanglement, impact, crushing, friction, or cutting hazards. Never attempt to slow or stop the lathe spindle with your hand. Allow the spindle to come to a stop on its own or use the brake.

**Crashes.** Aggressively driving the cutting tool or other lathe components into the chuck may cause an explosion of metal fragments, which can result in severe impact injuries and major damage to the lathe. Reduce this risk by releasing automatic feeds after use, not leaving lathe unattended, and checking clearances before starting the lathe. Make sure no part of the tool, tool holder, compound rest, cross slide, or carriage will contact the chuck during operation.

**Long Stock Safety.** Long stock can whip violently if not properly supported, causing serious impact injury and damage to the lathe. Reduce this risk by supporting any stock that extends from the chuck/headstock more than three times its own diameter. Always turn long stock at slow speeds.

**Coolant Safety.** Coolant is a very poisonous biohazard that can cause personal injury from skin contact alone. Incorrectly positioned coolant nozzles can splash on the operator or the floor, resulting in an exposure or slipping hazard. To decrease your risk, change coolant regularly and position the nozzle where it will not splash or end up on the floor.

# Chuck Safety

**Entanglement.** Entanglement with a rotating chuck can lead to death, amputation, broken bones, or other serious injury. Never attempt to slow or stop the lathe chuck by hand, and always roll up long sleeves, tie back long hair, and remove any jewelry or loose apparel BEFORE operating.

**Using Correct Equipment.** Many workpieces can only be safely turned in a lathe if additional support equipment, such as a tailstock or steady rest, is used. If the operation is too hazardous to be completed with the lathe or existing equipment, the operator must have enough experience to know when to use a different machine or find a safer way.

**Disconnect Power.** Serious entanglement or impact injuries could occur if the lathe is started while you are adjusting, servicing, or installing the chuck. Always disconnect the lathe from power before performing these procedures.

**Proper Maintenance.** All chucks must be properly maintained and lubricated to achieve maximum clamping force and withstand the rigors of centrifugal force. To reduce the risk of a thrown workpiece, follow all maintenance intervals and instructions in this document.

**Chuck Capacity.** Avoid exceeding the capacity of the chuck by clamping an oversized workpiece. If the workpiece is too large to safely clamp with the chuck, use a faceplate or a larger chuck if possible. Otherwise, the workpiece could be thrown from the lathe during operation, resulting in serious impact injury or death.

**Clamping Force.** Inadequate clamping force can lead to the workpiece being thrown from the chuck and striking the operator or bystanders. Maximum clamping force is achieved when the chuck is properly maintained and lubricated, all jaws are fully engaged with the workpiece, and the maximum chuck clamping diameter is not exceeded.

**Trained Operators Only.** Using a chuck incorrectly can result in workpieces coming loose at high speeds and striking the operator or bystanders with deadly force. To reduce the risk of this hazard, read and understand this document and seek additional training from an experienced chuck user before using this chuck.

## Preparation Overview

The purpose of the preparation section is to help you prepare your machine for operation. The list below outlines this basic process. Specific steps for each of these points will be covered in detail later in this section.

### The typical preparation process is as follows:

1. Unpack the lathe and inventory the contents of the box/crate.
2. Clean the lathe and its components.
3. Identify an acceptable location for the lathe and move it to that location.
4. Level the lathe and either bolt it to the floor or place it on mounts.
5. Assemble the loose components and make any necessary adjustments or inspections to ensure the lathe is ready for operation.
6. Check/lubricate the lathe.
7. Connect the lathe to the power source.
8. Test run the lathe to make sure it functions properly.
9. Perform the spindle break-in procedure to prepare the lathe for operation.

## Things You'll Need

To complete the preparation process, you will need the following items:

### For Lifting and Moving

- A forklift or other power lifting device rated for at least 5000 lbs.
- Lifting straps rated for at least 5000 lbs. each
- (Optional) Chain w/safety hook rated for at least 5000 lbs. each
- Two other people for moving machine
- Two 12" 2x6's
- Precision level

### For Power Connection

- A power source that meets the minimum circuit requirements for this machine (review the **Power Supply** section on **Page 19** for details)
- An electrician or qualified service personnel to ensure a safe and code-compliant connection to the power source

### For Assembly

- Cotton rags
- Mineral spirits
- Quality metal protectant oil
- Safety glasses
- Wrench or socket 21mm
- Wrench or socket 19mm
- Floor mounting hardware as needed
- Standard screwdriver #2

# Power Supply Requirements

## Availability

Before installing the machine, consider the availability and proximity of the required power supply circuit. If an existing circuit does not meet the requirements for this machine, a new circuit must be installed.

To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring must be done by an electrician or qualified service personnel in accordance with applicable electrical codes and safety standards.

## WARNING

**Serious injury could occur if you connect the machine to power before completing the setup process. DO NOT connect to power until instructed later in this manual.**

## Full-Load Current Rating

The full-load current rating is the amperage a machine draws at 100% of the rated output power. On machines with multiple motors, this is the amperage drawn by the largest motor or sum of all motors and electrical devices that might operate at one time during normal operations.

**SB1053 Full-Load Rating ..... 20.3 Amps**  
**SB1054F Full-Load Rating..... 10.15 Amps**  
**SB1055F Full-Load Rating..... 10.23 Amps**

The full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating.

If the machine is overloaded for a sufficient length of time, damage, overheating, or fire may result—especially if connected to an undersized circuit. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the requirements in the following section.

## Circuit Requirements

### Model SB1053

This machine is prewired to operate on a 220V power supply circuit that has a verified ground and meets the following requirements:

**Nominal Voltage ..... 220V/230V**  
**Cycle ..... 60 Hz**  
**Phase ..... 3-Phase**  
**Circuit Rating..... 30 Amps**  
**Plug/Receptacle Type ..... NEMA L15-30**  
**Cord ..... "S"-Type, 4-Wire, 10 AWG, 300 VAC**

### Model SB1054F & SB1055F

These machines are prewired to operate on a 440V power supply circuit that has a verified ground and meets the following requirements:

**Nominal Voltage ..... 440V/480V**  
**Cycle ..... 60 Hz**  
**Phase ..... 3-Phase**  
**Circuit Rating..... 15 Amps**  
**Connection.. Hardwire with Locking Switch**

A power supply circuit includes all electrical equipment between the main breaker box or fuse panel in your building and the incoming power connections inside the machine. This circuit must be safely sized to handle the full-load current that may be drawn from the machine for an extended period of time. (If this machine is connected to a circuit protected by fuses, use a time delay fuse marked D.)

## CAUTION

**For your own safety and protection of property, consult an electrician if you are unsure about wiring practices or applicable electrical codes.**

**Note:** The circuit requirements in this manual are for a dedicated circuit—where only one machine will be running at a time. If this machine will be connected to a shared circuit where multiple machines will be running at the same time, consult a qualified electrician to ensure the circuit is properly sized.

## Grounding Requirements

This machine must be grounded! In the event of certain types of malfunctions or breakdowns, grounding provides a path of least resistance for electric current in order to reduce the risk of electric shock.

Improper connection of the equipment-grounding wire can result in a risk of electric shock. The wire with green insulation (with or without yellow stripes) is the equipment-grounding wire. If repair or replacement of the power cord is necessary, do not connect the equipment-grounding wire to a live (current carrying) terminal.

Check with a qualified electrician or service personnel if you do not understand these grounding requirements, or if you are in doubt about whether the machine is properly grounded. If you ever notice that a cord is damaged or worn, disconnect it from power, and immediately replace it with a new one.

### 220V Operation

The power cord and plug specified under **Circuit Requirements** section for the Model SB1053 on the previous page has an equipment-grounding wire and a grounding prong. The plug must only be inserted into a matching receptacle (outlet) that is properly installed and grounded in accordance with all local codes and ordinances (see **Figure 11**).

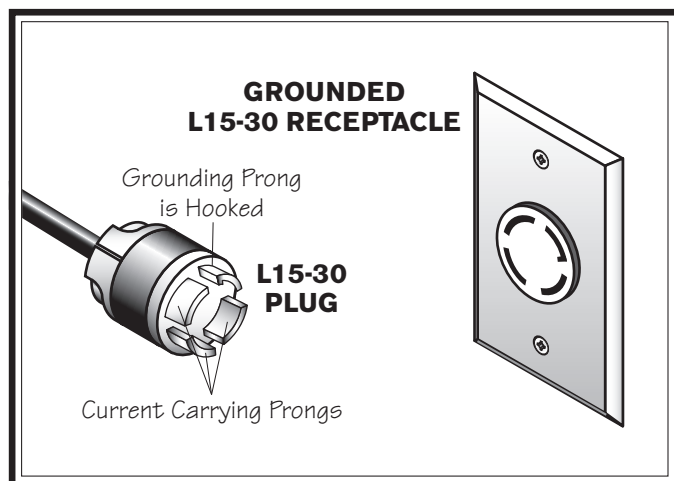
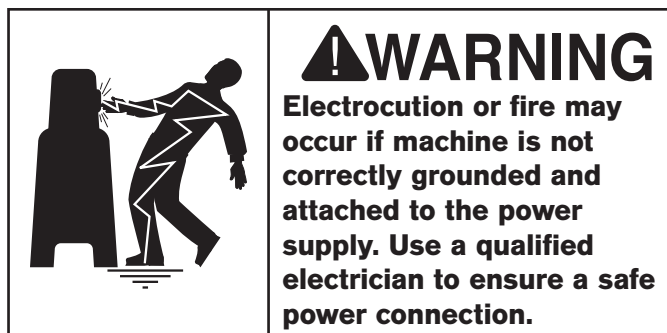


Figure 11. Typical NEMA L15-30 plug and receptacle.



### 440V Operation

As specified in the **Circuit Requirements** section for the Models SB1054F and SB1055F on the previous page, these machines must be hardwired to the power source, using a locking switch (see **Figure 12**). These machines must also be connected to a grounded metal permanent wiring system; or to a system with an equipment-grounding conductor. Due to the complexity and high voltage involved, this type of installation **MUST** be done by a qualified electrician or service personnel.

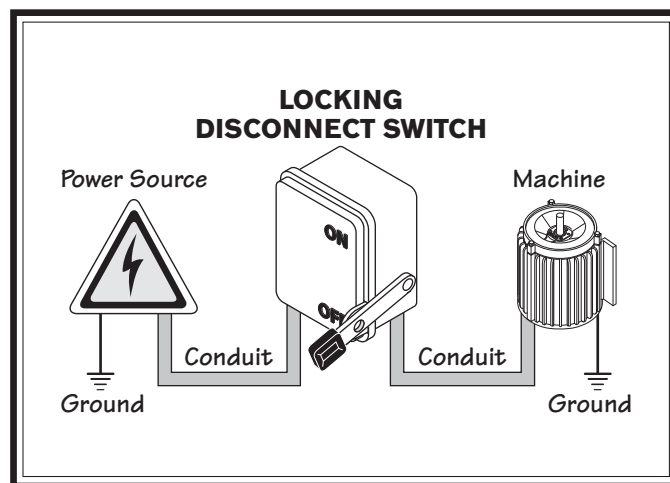


Figure 12. Typical hardwire setup with a locking disconnect switch.

# Unpacking

This item was carefully packaged to prevent damage during transport. If you discover any damage, please immediately call Customer Service at (360) 734-1540 for advice. You may need to file a freight claim, so save the containers and all packing materials for possible inspection by the carrier or its agent.

# Inventory

**Main Inventory 1: (Figure 13)** **Qty**

- A.** Steady Rest Assembly..... 1
- B.** 12" Faceplate w/D1-6 Camlock Stud Set ..... 1
- C.** 3-Jaw Chuck Key ..... 1
- D.** Model SB1228 10" Four-Jaw Chuck  
w/Combo Jaws ..... 1
- E.** 4-Jaw Chuck Key (Clamped on Lathe) ..... 1
- F.** Tool Post T-Wrench (Clamped on Lathe)..... 1
- G.** Follow Rest Assembly (Installed)..... 1

**Tool Box Inventory: (Figure 14)** **Qty**

- H.** Tool Box ..... 1
- I.** Open End Wrench 22/24mm ..... 1
- J.** Open End Wrench 14/17mm ..... 1
- K.** Open End Wrench 10/12mm ..... 1
- L.** Phillips Screwdriver #2 ..... 1
- M.** Standard Screwdriver #2..... 1
- N.** Carbide-Tipped Dead Center MT#4..... 1
- O.** Dead Center MT#4..... 1
- P.** Tapered Spindle Sleeve MT#6-#4 ..... 1
- Q.** Carriage Handwheel Handle..... 1
- R.** Cross Slide Handwheel Handle..... 1
- S.** Hex Wrench Set 1.5-10mm..... 1
- T.** Hex Wrench 10mm ..... 1
- U.** Cast Iron Feet ..... 8

**Installed & Not Shown** **Qty**

- SB1309 9" 3-Jaw Chuck (SB1053) ..... 1
- SB1310 10" 3-Jaw Chuck (SB1054F-55F) .... 1

**Note:** Some inventory components or additional documentation may be shipped inside of the lathe electrical cabinet. These items **MUST** be removed before connecting the lathe to the power source.

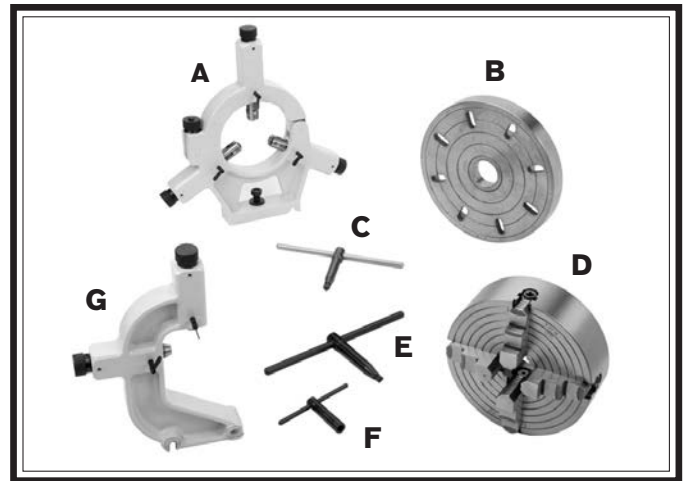


Figure 13. Main inventory.

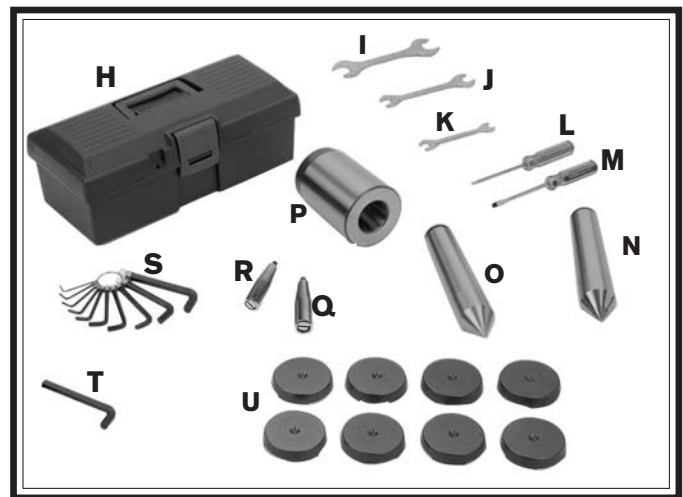


Figure 14. Toolbox inventory.

## Cleaning & Protecting

The unpainted surfaces are coated at the factory with a heavy-duty rust preventative that prevents corrosion during shipment and storage. The benefit of this rust preventative is that it works very well. The downside is that it can be time-consuming to thoroughly remove.

Be patient and do a careful job when cleaning and removing the rust preventative. The time you spend doing this will reward you with smooth-sliding parts and a better appreciation for the proper care of the unpainted surfaces.

Although there are many ways to successfully remove the rust preventative, the following process works well in most situations.

### Before cleaning, gather the following:

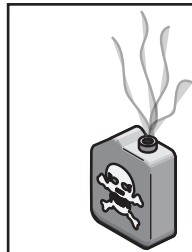
- Disposable rags
- Cleaner/degreaser (certain citrus-based degreasers work extremely well and they have non-toxic fumes)
- Safety glasses & disposable gloves

**Note:** Automotive degreasers, mineral spirits, or WD•40 can be used to remove rust preventative. Before using these products, though, test them on an inconspicuous area of a painted surface to make sure they will not damage it.



### ⚠ WARNING

Gasoline and petroleum products have low flash points and can explode or cause fire if used for cleaning. Avoid using these products to remove rust preventative.



### ⚠ CAUTION

Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.

## NOTICE

**Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer's instructions when using any type of cleaning product.**

### Basic steps for removing rust preventative:

1. Put on safety glasses and disposable gloves.
2. Coat all surfaces that have rust preventative with a liberal amount of your cleaner or degreaser and let them soak for a few minutes.
3. Wipe off the surfaces. If your cleaner or degreaser is effective, the rust preventative will wipe off easily.

**Note:** To clean off thick coats of rust preventative on flat surfaces, such as beds or tables, use a PLASTIC paint scraper to scrape off the majority of the coating before wiping it off with your rag. (Do not use a metal scraper or it may scratch the surface.)

4. Repeat **Steps 2–3** as necessary until clean, then coat all unpainted surfaces with a quality metal protectant or light oil to prevent rust.

## NOTICE

**Remove the end gear cover and end gears, and use a stiff brush with mineral spirits to clean the rust preventative from the gears and shafts. DO NOT get any cleaner or rust preventative on the V-belts, as it could damage them or make them slip during operations. If the belts do become contaminated, replace them.**

# Location

## Physical Environment

The physical environment where your machine is operated is important for safe operation and longevity of parts. For best results, operate this machine in a dry environment that is free from excessive moisture, hazardous or flammable chemicals, airborne abrasives, or extreme conditions. Extreme conditions for this type of machinery are generally those where the ambient temperature is outside the range of 41°–104°F; the relative humidity is outside the range of 20–95% (non-condensing); or the environment is subject to vibration, shocks, or bumps.

## Electrical Installation

Place this machine near an existing power source that meets the minimum circuit requirements. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Leave access to disconnect the power source or engage a lockout/tagout device.

## Lighting

Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

## Weight Load

Refer to the **Machine Specifications** for the weight of your machine. Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

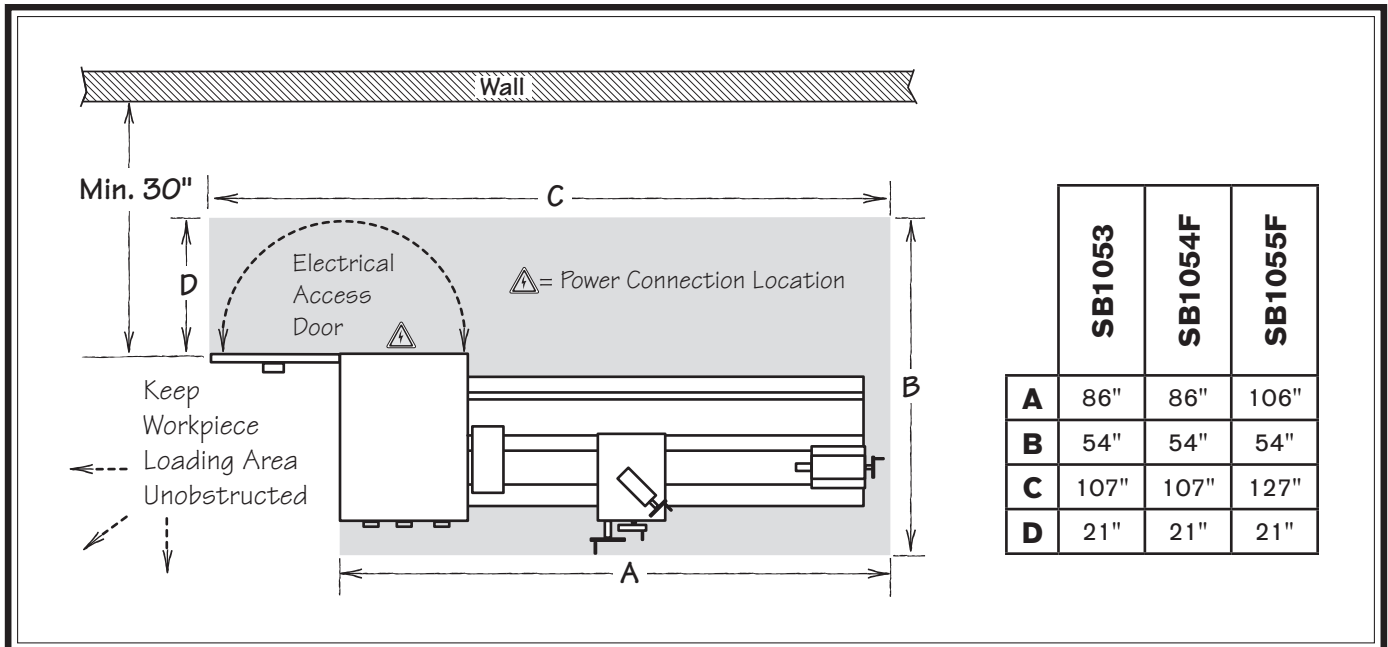
## Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual.



**⚠ CAUTION**

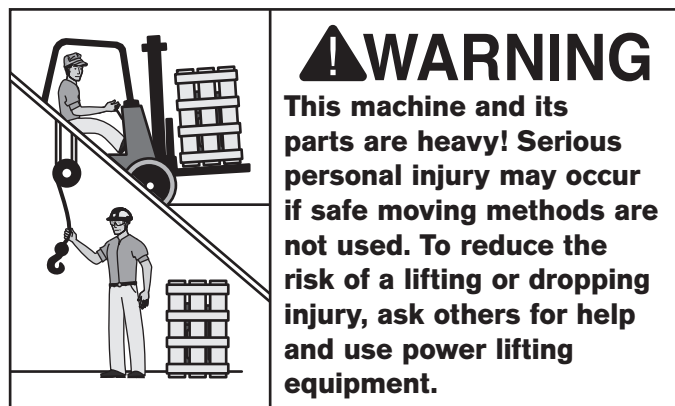
**Children or untrained people may be seriously injured by this machine. Install machine in an access restricted location.**



**Figure 15. Space required for full range of movement.**



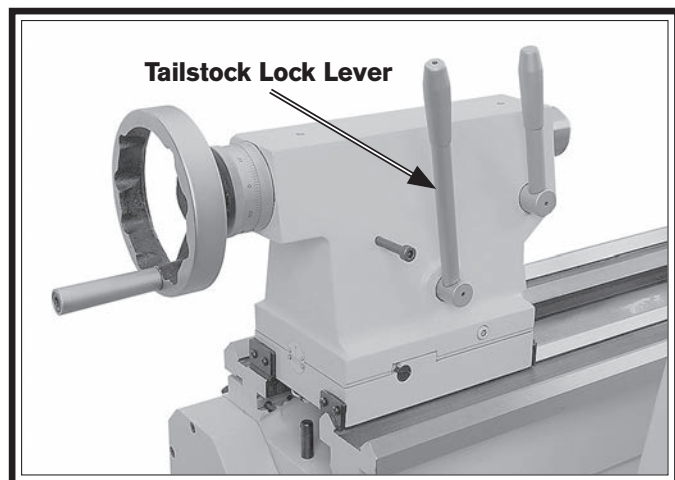
# Lifting & Moving



Do not attempt to lift or move this lathe without using the proper lifting equipment or the necessary assistance from other people. Each piece of lifting equipment must be rated for at least 5000 lbs. to support dynamic loads that may be applied while lifting. Refer to the **Things You'll Need** subsection on **Page 17** for details.

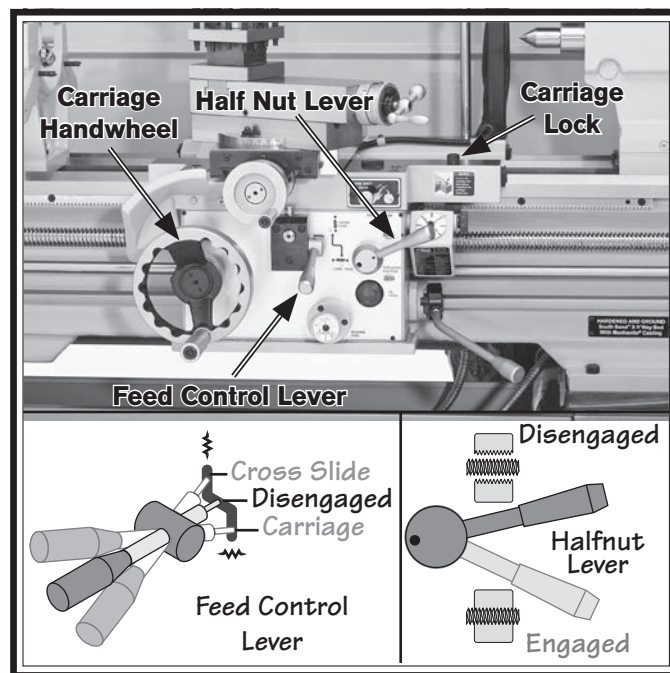
### To lift and move the lathe:

1. Remove the shipping crate top and sides, then remove the small components from the shipping pallet.
2. Use a forklift to move the lathe to its prepared location while it is still attached to the shipping pallet.
3. To prepare for lifting the lathe, balance the load by loosening the tailstock lock lever (see **Figure 16**) and moving the tailstock to the end of the bedway. Be sure to lock it in place.



**Figure 16.** Tailstock lock lever.

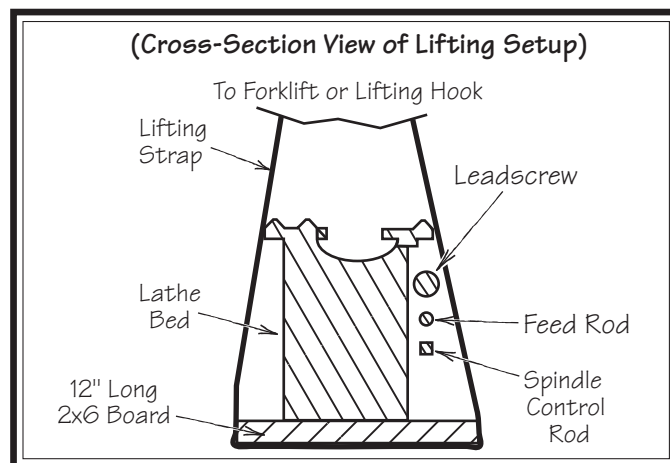
4. To further balance the load, loosen the carriage lock bolt (see **Figure 17**), disengage the half nut lever, disengage the feed control lever, then use the carriage handwheel to move the carriage next to the tailstock.



**Figure 17.** Carriage controls set for moving the carriage.

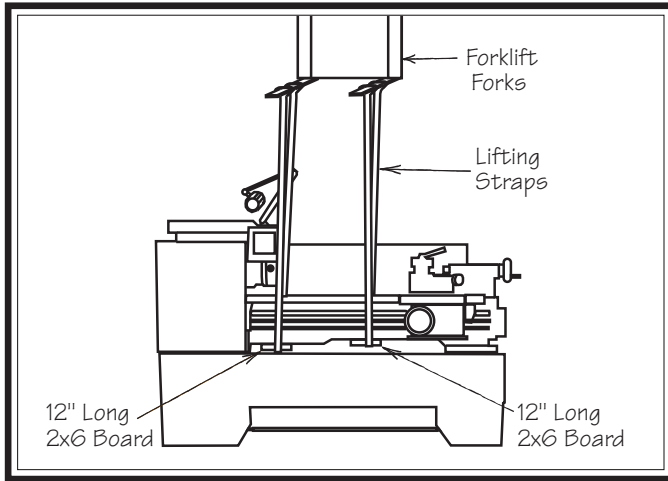
5. Position a 12" long 2x6 board under each end of the bed, as illustrated in **Figure 18**, then wrap the lifting straps around the bottom of the 2x6's.

**Note:** The 2x6's extend the lifting straps away from the bottom of the bed to prevent machine damage from excessive strap pressure against the leadscrew, feed rod, and spindle control rod. Make sure to use them.

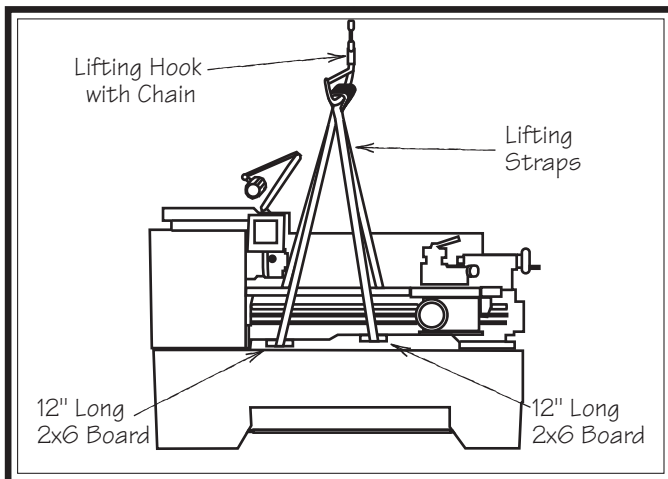


**Figure 18.** Cross section of lifting setup.

6. Attach the lifting straps to the forklift forks or a hook and chain, as shown in **Figures 19–20**.



**Figure 19. Lathe set up for lifting with forklift.**



**Figure 20. Lathe set up for lifting with hook and chain.**

7. Unbolt the lathe from the shipping pallet, then with two other people to help keep the lathe from swaying, raise it a couple of inches.
- If the load is not well balanced, or you see any other difficulties with the lifting equipment, immediately lower the lathe to the pallet again. Resolve any lifting or balancing issues, then repeat this step.
8. Lift the lathe enough to clear the shipping pallet and remove the pallet, then lower the lathe enough to clear any small floor obstacles and move it to the prepared location and lower it in place.

## Leveling & Mounting

You must level your machine and either use the included foot pads and leveling hardware or bolt and shim your lathe to the floor. Because mounting your lathe to the floor with permanent hardware is an optional step and floor materials may vary, floor mounting hardware is not included.

### Leveling

## NOTICE

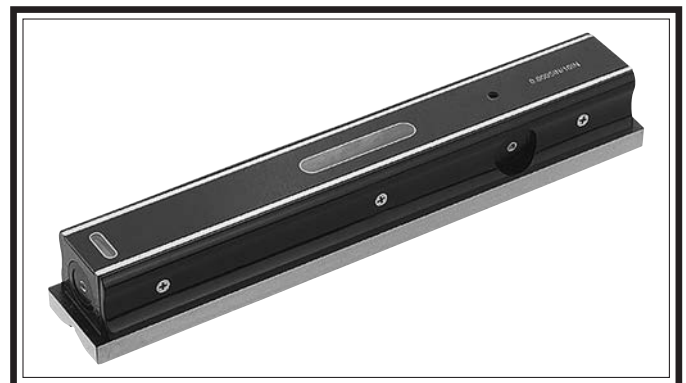
**For accurate turning results and to prevent warping the cast iron bed and ways, the lathe bedways MUST be leveled from side-to-side and from front-to-back on both ends.**

**Re-check the bedways 24 hours after installation, two weeks after that, and then annually to make sure they remain level.**

Leveling machinery helps precision components, such as bedways, remain straight and flat during the lifespan of the machine. Components on a machine that is not level may slowly twist due to the dynamic loads placed on the machine during operation.

For best results, use a precision level that is at least 12" long and sensitive enough to show a distinct movement when a 0.003" shim (approximately the thickness of one sheet of standard newspaper) is placed under one end of the level.

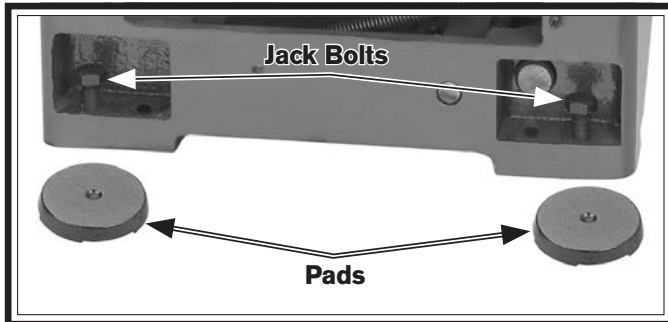
See the figure below for an example of a high precision level.



**Figure 21. Example of a precision level.**

To level the machine, use a precision level to make sure the bedways are level from side-to-side and from front-to-back.

- If using the included leveling pads (see **Figure 22**), place them under the six leveling jack bolt locations, then adjust the bolts to level the lathe.

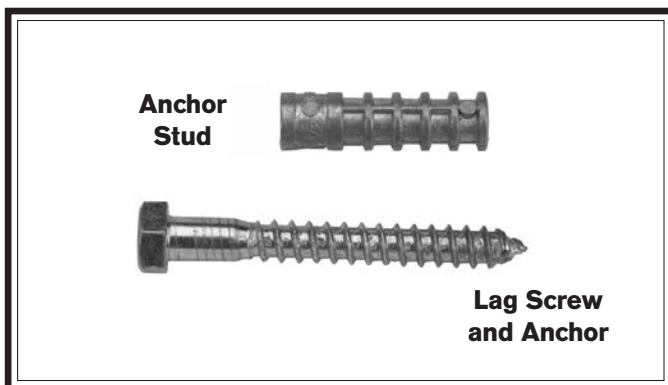


**Figure 22. Leveling pads and screws.**

- If using mounting hardware that does not allow for adjustment, level the lathe by placing metal shims between the lathe base and the floor before bolting it down.

## Bolting to Concrete Floors

Lag screws and anchors, or anchor studs (**below**), are two popular methods for bolting machinery to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best one for your specific application.



**Figure 23. Common types of fasteners for bolting machinery to concrete floors.**

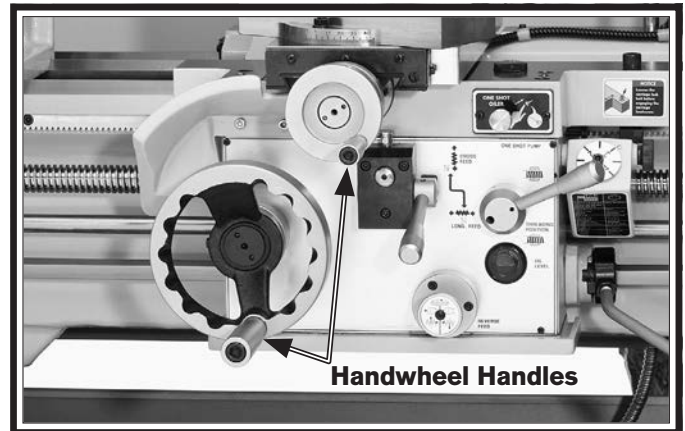
## NOTICE

Most electrical codes require that machines connected to the power source by fixed conduit **MUST** be secured to the floor.

## Assembly

With the exception of the handwheel handles, the lathe is shipped fully assembled.

To install the handwheel handles, thread the large handle into the carriage handwheel and the small handle into the cross slide handwheel, as shown in **Figure 24**.



**Figure 24. Handwheel handles installed.**

## Lubricating Lathe



The headstock, quick-change gearbox, and apron oil reservoirs must have the proper amount of oil in them before the lathe can be operated for the first time.

Damage caused to the bearings and gears from running the lathe without oil in the reservoirs will not be covered under warranty. Refer to the **Lubrication** section, beginning on **Page 67**, for details on how to check and add oil.

In addition to the reservoirs, we also recommend that you lubricate all other points on the machine at this time. This can be accomplished by following the maintenance schedule on **Page 65**.

**Note:** If this lathe was shipped with oil in the reservoirs, do not change that oil until after the test run and break-in procedures.

## Adding Coolant

Add the coolant of your choice now. For detailed instructions on where the coolant tank is located and how to add fluid, refer to **Coolant System Service** subsection on **Page 72**.

## Power Connection

After you have completed all previous setup instructions and circuit requirements, the machine is ready to be connected to the power supply.

### Model SB1053

Connect a power cord that meets the **Circuit Requirements** on **Page 18**, as instructed later in this subsection. Attach a locking NEMA L15-30 plug as directed by the plug manufacture, and insert it into a matching receptacle that is connected to a circuit that meets the requirements listed on **Page 18**.

### **NOTICE**

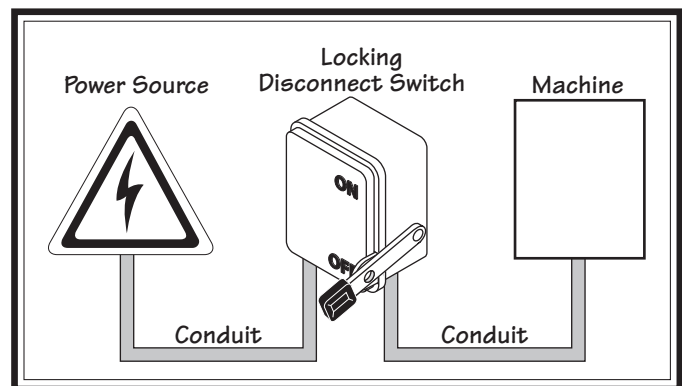
**When removing the plug from the receptacle, grasp it and pull it completely out of the receptacle. Do not pull by the cord as this may damage the wires inside.**

### Model SB1054F & SB1055F

Due to the complexity required for planning, bending, and installing the conduit necessary for a code-compliant hardwire setup, an electrician or other qualified person **MUST** perform this type of installation.

Hardwire setups typically require power supply wires to be enclosed inside of a solid or flexible conduit, which is securely mounted at both ends with the appropriate conduit fittings. All work must adhere to the required electrical codes.

The hardwire setup must include a locking disconnect switch (see **Figure 25**) between the power source and the machine. This switch serves as the means to completely disconnect the machine from power to prevent electrocution from accidental startup during adjustments, maintenance, or service to the machine.



**Figure 25. Typical hardwire setup with a locking disconnect switch.**

## ⚠ WARNING

Electrocution could occur if you attempt this procedure with the power wires connected to the power source. The incoming power wires must be disconnected from power before performing this procedure.

### Connecting Power

1. Make sure the master power switch is turned to the OFF position, then open the electrical cabinet door.
2. Refer to **Figure 26** to identify the master power switch and the hole at the bottom of the electrical cabinet for the incoming power.

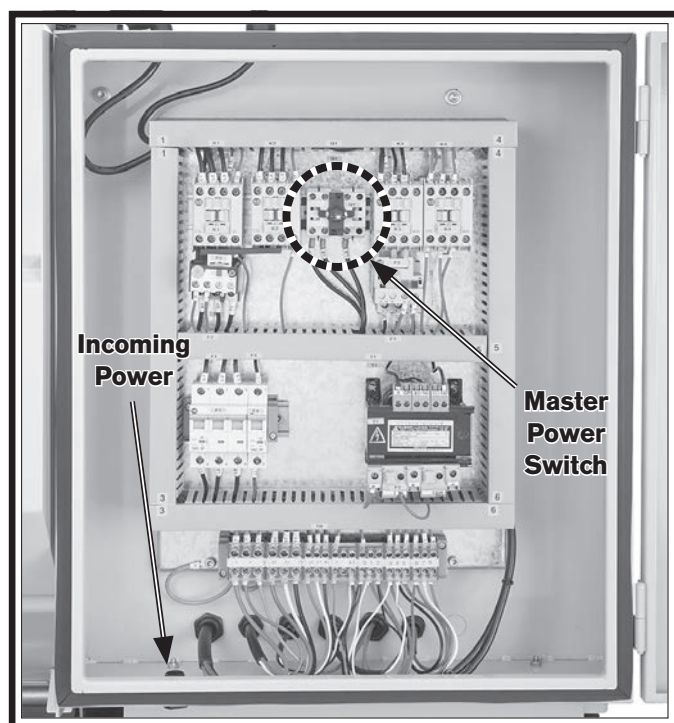


Figure 26. Location to connect power inside main electrical cabinet.

**Note:** For the Model SB1053, thread the power cord through an approved and properly sized strain relief as it enters the electrical cabinet. The strain relief must be tightened against the outer jacket of the cord; however, avoid over-tightening the strain relief or it may crush the cord and cause a short.

Test the strain relief to ensure it is properly tightened by pulling the cord from outside the cabinet with light-to-moderate force. When the strain relief is properly tightened, the cord will not move inside the cabinet.

3. Connect the incoming hot wires to the upper master power switch terminals and the ground wire to the ground terminal, as illustrated in **Figure 27**.

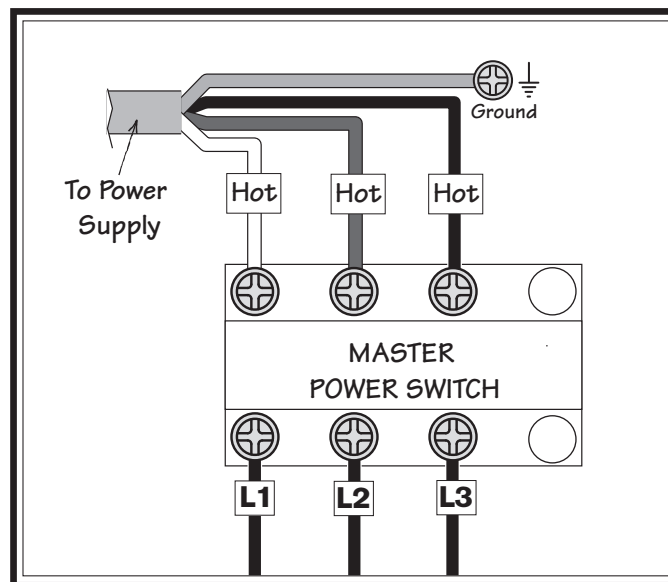


Figure 27. Power connection at master power switch.

4. Make sure the wires have enough slack so that they do not bind at the terminals.
5. Close and lock the main electrical box door.

# Test Run

After all preparation steps have been completed, the machine and its safety features must be tested to ensure correct operation. If you discover a problem with the operation of the machine or its safety components, shut the machine down, disconnect it from power, and do not operate it further until you have resolved the problem.

A **Troubleshooting** section is provided, starting on **Page 86**, to assist you with solutions if a problem occurs or if the lathe does not function as described in this section.

If you need additional help after reviewing the troubleshooting section, or you are not confident troubleshooting the machine on your own, contact our tech support at (360) 734-1540.

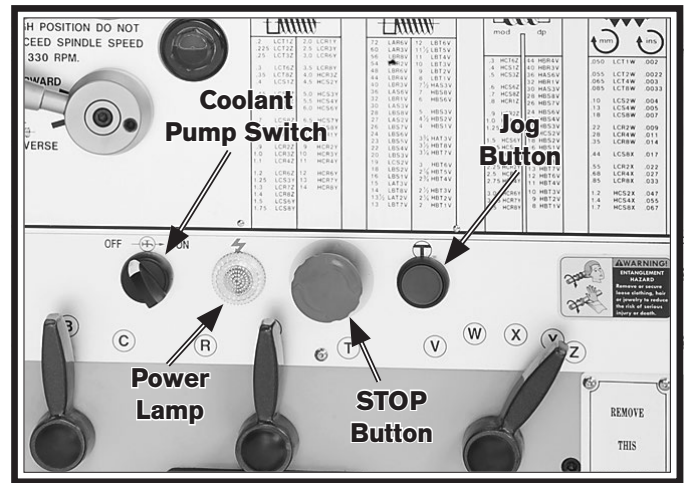
### To test run your machine:

1. Read and follow the safety instructions at the beginning of the manual, take all required safety precautions, and make sure all previous preparation steps discussed in this manual have been followed and completed.
2. Clear away all tools and objects used during assembly, lubrication, and preparation.
3. Make sure the master power switch shown in **Figure 28** is turned **OFF**.



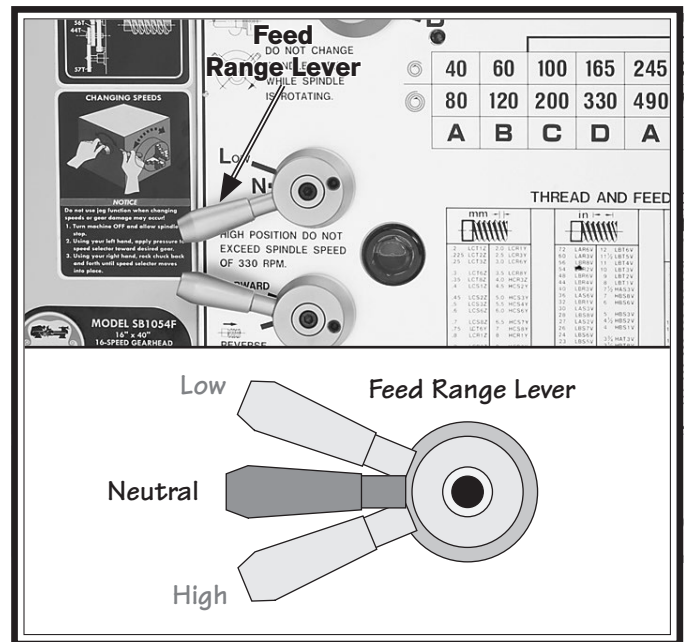
**Figure 28.** Location of the master power switch.

4. DISCONNECT LATHE FROM POWER!
5. Make sure that the chuck and jaws, if installed, are secure (refer to **Chuck Installation on Page 35**), then lower the chuck guard.
6. Turn the coolant switch (see **Figure 29**) to the OFF position, and point the fluid nozzle into the chip drawer.



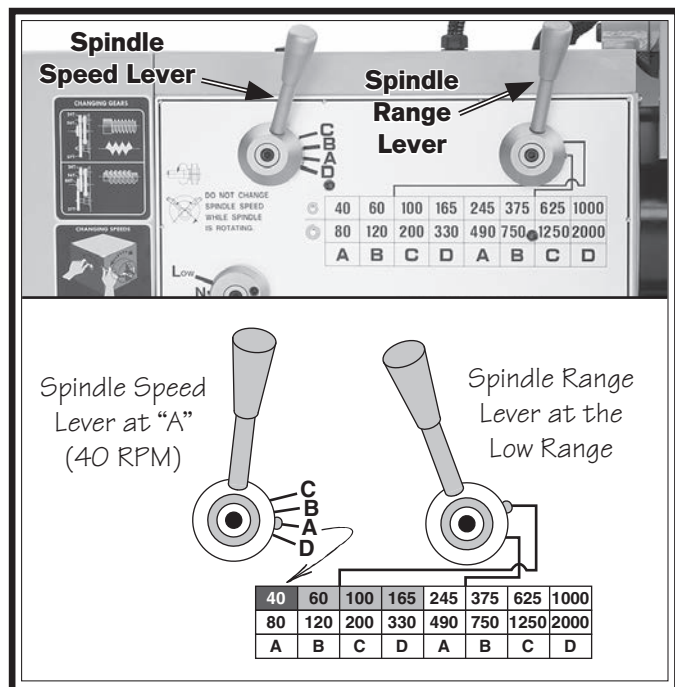
**Figure 29.** Control panel.

7. To ensure the carriage components do not unexpectedly move when the lathe is started, move the feed range lever to the neutral (middle) position (see **Figure 30**).



**Figure 30.** Feed range lever.

8. Set the spindle speed to 40 RPM. You may have to manually rock the chuck back-and-forth to make the gears mesh.
  - a. Turn the two-speed motor switch to the LOW position.
  - b. Move the spindle range lever so that the indicator points to the upper line on the right—this is the low range for this motor speed (see **Figure 31**).
  - c. Rotate the spindle speed lever so that the indicator points to the "A".

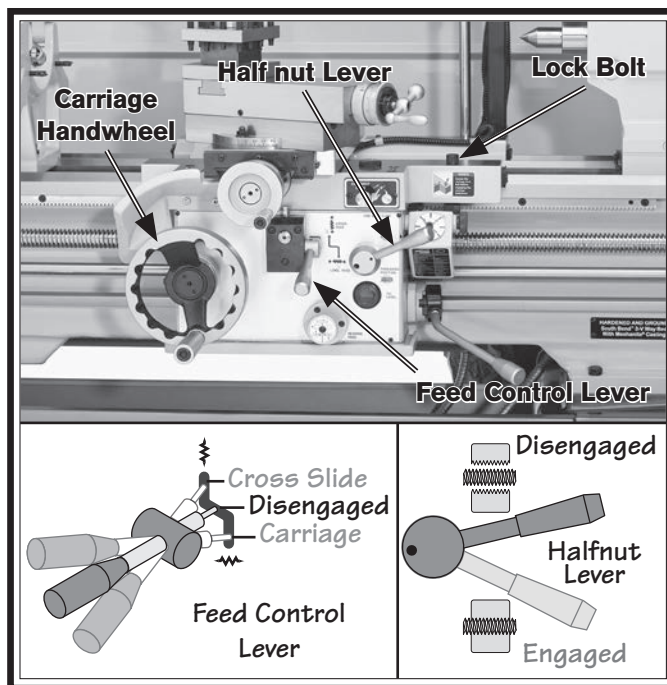


**Figure 31. Spindle speed set to 40 RPM.**

**NOTICE**

**DO NOT use the jog button to help mesh the gears when changing spindle speeds or range. This could damage the gears and connected components.**

9. To allow the carriage to move freely when the handwheel is rotated, disengage the half nut lever, put the feed control lever in disengaged position, and make sure the carriage lock is loose (see **Figure 32**).



**Figure 32. Carriage controls set for moving the carriage.**

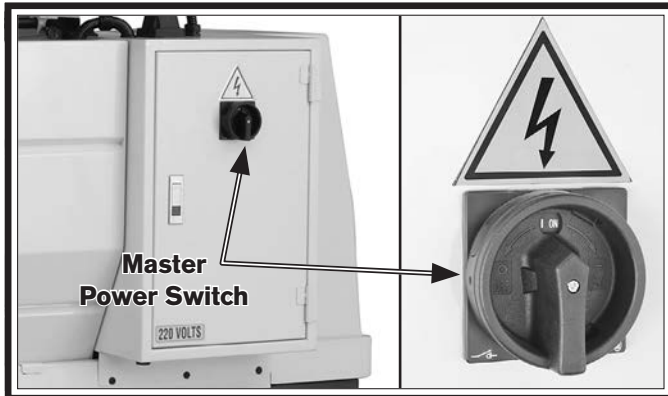
10. Move the spindle ON/OFF lever to the OFF (middle) position, as shown in **Figure 33**.



**Figure 33. Spindle ON/OFF lever in the OFF (middle) position.**

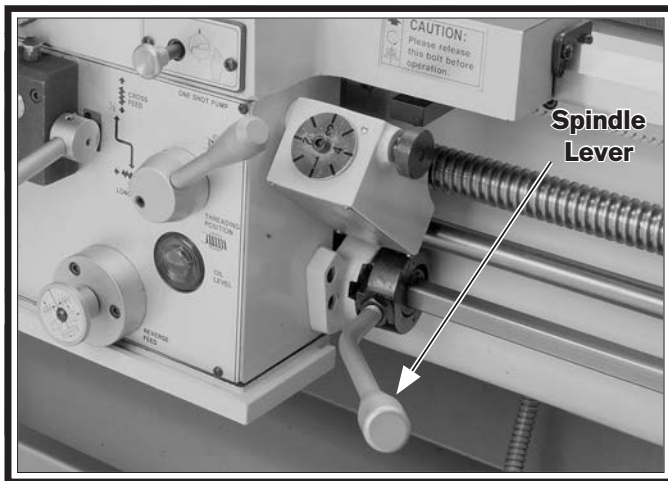
11. Press the STOP button on the control panel (see **Figure 29** on **Page 28**) to ensure that the lathe does not unexpectedly start when connected to power during the next step.

12. Connect the lathe to the power source, then turn the master power switch to the ON position (see **Figure 34**).



**Figure 34. Master power switch turned ON.**

13. To reset the STOP button and enable power to the lathe electrical controls, twist the STOP button clockwise until it pops out. The power light on the control panel should illuminate (see **Figure 29** on **Page 28**).
14. Verify that the machine is operating correctly by moving the spindle ON/OFF lever out and down to start spindle rotation (see **Figure 35**).



**Figure 35. Spindle ON/OFF lever in down (forward) position.**

— When operating correctly, the machine runs smoothly with little or no vibration or rubbing noises.

— Investigate and correct strange or unusual noises or vibrations before operating the machine further. Always disconnect the machine from power when investigating or correcting potential problems.

15. With the spindle ON/OFF lever in the down position, verify that the spindle/chuck is rotating counterclockwise (down and toward the front of the lathe).

— If the spindle/chuck are not rotating counterclockwise, the power supply is likely connected out-of-phase. Stop the machine, disconnect it from power, then follow the instructions for **Correcting Phase Polarity Wiring** on **Page 90**.

After correcting the wiring, repeat **Steps 11–15**.

16. Press the STOP button to turn the lathe **OFF**, then, without resetting the STOP button, try to restart the lathe with the spindle ON/OFF lever.

— If the lathe does not start with the STOP button pressed in, the STOP button safety feature is working properly.

— If the lathe does start with the STOP button pressed in, the STOP button safety is not operating correctly. This safety feature must operate properly before continuing. Use the spindle ON/OFF lever to stop the lathe, disconnect it from power, and call Tech Support for help.



17. Move the spindle ON/OFF lever to the OFF (middle) position, reset the STOP button by twisting it clockwise until it pops out, then restart spindle rotation.
  18. Push the foot brake. The lathe should come to a quick stop.
    - If the brake pedal has no effect on the lathe, push the STOP button, and refer to the **Brake & Switch** subsection on **Page 80** to make any required adjustments.

After verifying the brake works correctly, continue with the next step.
  19. Move the spindle ON/OFF lever to the OFF (middle) position. Remove the lathe end gear cover. This trips a safety switch that should prevent the lathe from starting while the cover is removed.
  20. Stand away from all the exposed gears on the side of the headstock, and attempt to start the lathe.
    - If the lathe starts with the end gear cover removed, the safety switch is not operating correctly. This safety feature must operate properly before continuing. Press the STOP button to turn the lathe **OFF**, disconnect the lathe from power, and call Tech Support for help.
  21. Push the STOP button in, move the spindle ON/OFF lever to the OFF position, then replace the end gear cover.
  22. Lift the chuck guard up—this will activate the chuck guard safety switch. Reset the STOP button and attempt to start the lathe.
    - If the lathe starts with the chuck guard in the up position, the safety switch is not operating correctly. This safety feature must operate properly before continuing. Press the STOP button to turn the lathe **OFF**, disconnect it from power, and call Tech Support for help.
  23. Point the coolant nozzle down into the chip drawer and verify that there is coolant in the reservoir (refer to **Coolant System Service** on **Page 72** for detailed instructions).
  24. Re-start the lathe, use the coolant pump switch on the control panel to start the pump, then open the valve. Verify that the coolant flows from the nozzle, then close the valve and turn the pump **OFF**.
- Congratulations! The test run is complete. Turn the lathe **OFF** and perform the **Spindle Break-In** procedure on the next page.

## **NOTICE**

**After the first 16 hours of use, the V-belts will stretch and seat into the pulley grooves. The V-belts must be properly re-tensioned after this period to avoid reducing their useful life. Refer to the V-Belts subsection on Page 80 for detailed instructions.**

## Spindle Break-In

The high-quality bearings and gears used in this lathe are manufactured to very close tolerances. Before subjecting the lathe to full loads, it is essential to complete the spindle break-in process as described below. This will ensure the best results and maximum life of the precision components inside the lathe.

The break-in procedure must be performed in succession with the **Test Run** procedure described in this manual, because many of the test run steps prepare the lathe controls for the break-in process.

**Important:** Do not perform the break-in procedure independently from the **Test Run** section—serious damage could occur to the lathe if the controls are set incorrectly when the break-in procedure is started.

### NOTICE

**Do not leave the lathe unattended during the Spindle Break-In procedure. If your attention is needed elsewhere during this procedure, stop the lathe and restart the procedure later from the beginning.**

#### To perform the spindle break-in:

1. Successfully complete the **Test Run** procedure beginning on **Page 28**.
2. Set the spindle speed for 40 RPM (refer to the **Setting Spindle Speed** subsection on **Page 51** for detailed instructions).
3. Run the lathe for 10 minutes.
4. Turn the lathe **OFF** and wait until the spindle is completely stopped.
5. Repeat **Steps 2–4** for each of the remaining 15 spindle speeds.
6. Set the spindle speed to 40 RPM and let the lathe run for a final 15 minutes to allow it to cool down, then turn the lathe **OFF**.
7. Change the oil in the headstock, quick-change gearbox, and apron reservoirs as instructed in the **Lubrication** subsection on **Page 67**.
8. Check and, if necessary, re-tension the V-belts as instructed in the **V-Belt** subsection on **Page 80**.

Congratulations! The spindle break-in is complete.

## Recommended Adjustments

For your convenience, the adjustments listed below have been performed at the factory.

However, because of the many variables involved with shipping, we recommend that you at least verify the following adjustments to ensure the best possible results from your new machine.

Step-by-step instructions for these adjustments can be found on the pages referenced below.

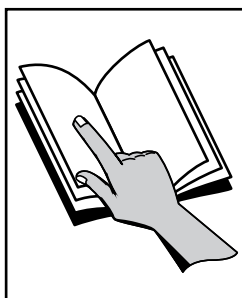
#### Factory adjustments that should be verified:

- Tailstock alignment (**Page 42**).
- Compound and cross slide backlash adjustment (**Page 75**).
- Gib adjustments (**Page 77**).

## Operation Overview

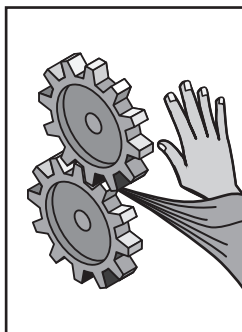
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

**Note:** Due to the generic nature of this overview, it is not intended to be an instructional guide for performing actual machine operations. To learn more about specific operations and machining techniques, seek training from people experienced with this type of machine, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.



### **!WARNING**

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any operations.



### **!WARNING**

Loose hair, clothing, or jewelry could get caught in machinery and cause serious injury or death. Keep these items away from moving parts at all times to reduce this risk.



### **!WARNING**

During operation, small metal chips may become airborne, leading to serious eye injury. Wear safety glasses to reduce this risk.

To complete a typical operation, the operator does the following:

1. Puts on safety glasses, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.
2. Examines the workpiece to make sure it is suitable for turning, then mounts the workpiece in one of the chucks or on the faceplate, and removes the chuck key from the chuck.
3. Mounts the tooling, aligns it with the workpiece, then backs it away to establish a safe startup clearance.
4. Clears all setup tools from the lathe.
5. Checks for safe clearances by rotating the workpiece by hand at least one full revolution.
6. Moves slides to where they will be used during operation.
7. Sets the correct spindle speed for the operation.
8. If using power feed, selects the proper feed rate for the operation.
9. Turns the master power switch **ON**, resets the STOP button, then uses the spindle ON/OFF lever to start spindle rotation.
10. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.
11. When finished cutting, moves the spindle ON/OFF lever to the OFF position, presses the foot brake to completely stop the spindle, then removes the workpiece.

## Chuck & Faceplate Mounting

This lathe is equipped with a D1-type spindle nose. This type of spindle uses camlocks to securely mount a chuck or faceplate with repeatable precision and ease.

### **⚠️ WARNING**

**Never use spindle speeds faster than the chuck RPM rating or the safe limits of your workpiece. Excessive spindle speeds greatly increase the risk of the workpiece or chuck being thrown from the machine with deadly force!**

This lathe ships with the 3-jaw chuck installed. This is a scroll-type chuck where all three jaws move in unison when the chuck key is used.

The included 4-jaw chuck features independent jaws, which are used for square or unevenly-shaped stock, and to mount work that needs to be adjusted to near zero total indicated runout.

If neither chuck can hold your workpiece, the cast iron faceplate has slots for T-bolts that hold standard or custom clamping hardware. With the correct clamping hardware, this faceplate will hold non-cylindrical parts.

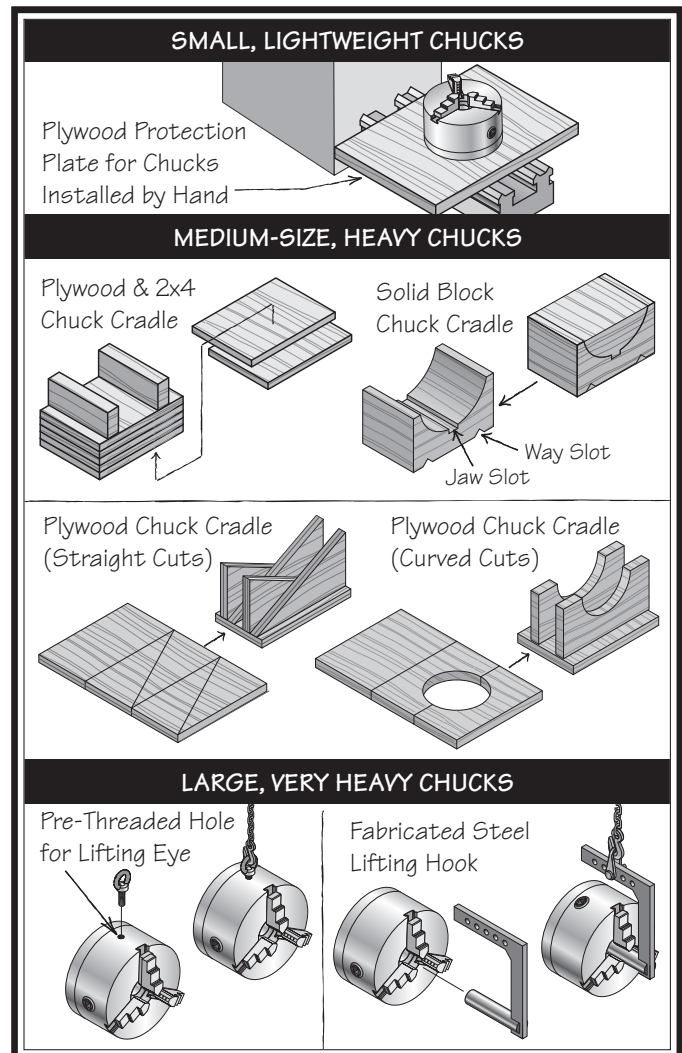
The chucks and faceplate have a D1-6 camlock mount. A chuck key is used to turn the locking cams to secure these devices to the spindle.

## Installation & Removal Devices

Because chucks are heavy and often awkward to hold, some kind of lifting, support, or protective device should be used during installation or removal. The weight and size of the chuck will determine the appropriate device to use (refer to the following figure for examples).

### **⚠️ WARNING**

**A dropped chuck can cause amputation, serious crushing injuries, or property damage. Always use a lifting, support, or protective device to reduce this risk when installing or removing a chuck.**



**Figure 36. Examples of common devices used during chuck installation and removal.**

## Chuck Installation

To ensure accurate work, it is extremely important to make sure the spindle nose and chuck mating surfaces/tapers are clean. Even a small amount of lint or debris can affect accuracy.

The chuck is properly installed when all camlocks are tight, the spindle and chuck tapers firmly lock together, and the back of chuck is firmly seated against the face of the spindle all the way around—without any gaps.

### To install the chuck:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate lifting, support, or protective device to protect the ways and support the chuck during the installation process.
3. Clean and lightly oil the camlock studs, then thoroughly clean the mating surfaces of the spindle and chuck.
4. Install the chuck by inserting the camlock studs straight into the spindle cam holes.

**Important:** Avoid inserting the studs by pivoting them in from an angle or rotating the spindle. This can damage studs or spindle cam holes.

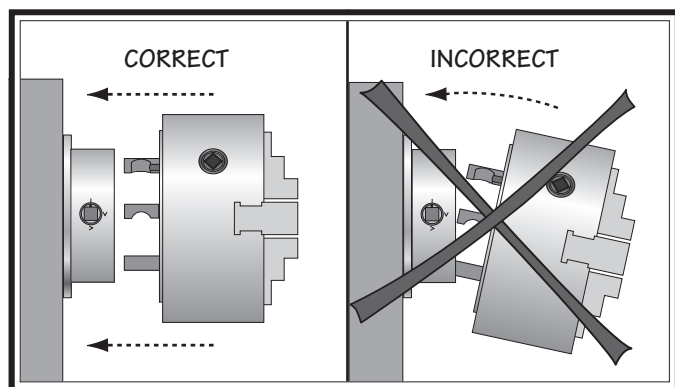


Figure 37. Inserting camlock studs into spindle bores.

5. Incrementally tighten the camlocks in a criss-cross or star pattern to ensure that the chuck seats evenly against the spindle.
6. When the chuck is fully seated and all the camlocks are tight, verify that the cam line is between the two "V" marks on the spindle nose, as shown in the following figure.

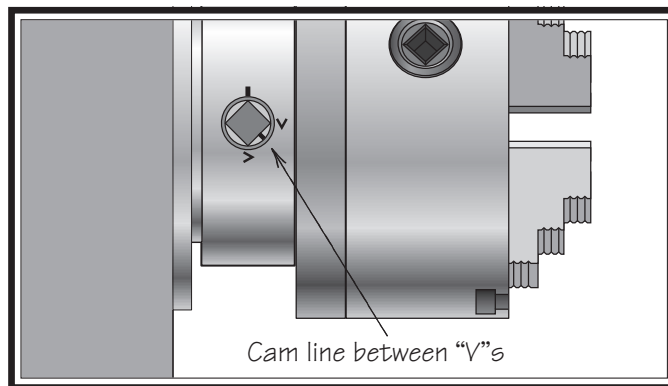


Figure 38. Cam line positioned between the "V" marks after the camlocks are fully tightened.

- If the cam line is NOT between the "V" marks when the camlock is tight, the stud may be installed at the incorrect height. To fix this, adjust the stud height as shown in the following figure. Make sure to re-install the stud cap screw afterward.
- If adjusting the stud height does not correct the problem, try swapping stud positions on the chuck.

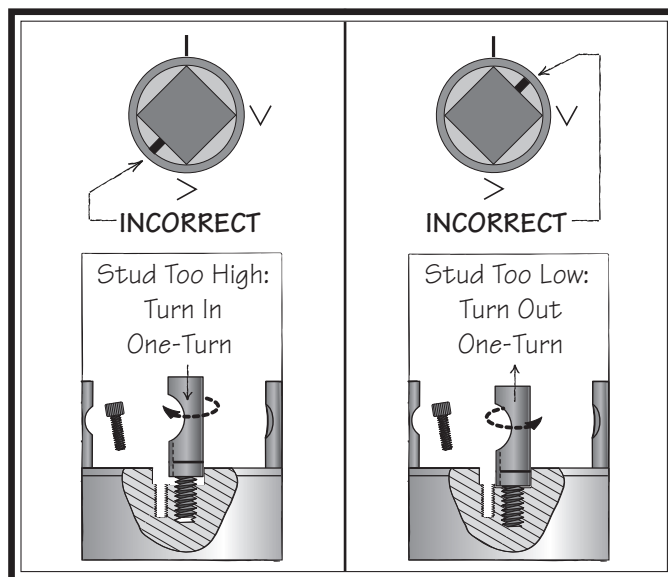
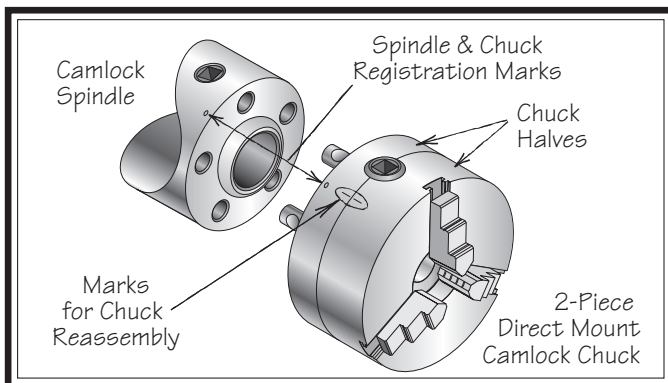


Figure 39. Correcting an improperly installed stud.

7. Verify that the chuck fits the spindle properly by checking for any gaps between the mating surfaces.
  - If there are no gaps, proceed to **Step 8**.
  - If there is a gap, remove the chuck, re-clean the mating surfaces carefully, and re-install. If the problem persists, refer to **Troubleshooting**.
8. Verify that the chuck/spindle tapers are seated firmly together by removing the chuck, per the **Chuck Removal** instructions, and pay close attention to how easily the tapers release.
  - If it was necessary to bump the chuck or use a mallet to release the tapers, then they are seating together properly.
  - If the tapers released easily with little intervention, they are not seated together firmly as required. Remove the chuck, re-clean the mating surfaces carefully, and re-install. If the problem persists, refer to **Troubleshooting**.

## Registration Marks

Lightly stamp registration marks across the mating seams of chuck components. These marks will help you re-install the chuck in the same position after removal, which ensures consistent chuck balance and turning results, and allows the same camlocks and studs to operate together for consistent locking and unlocking.



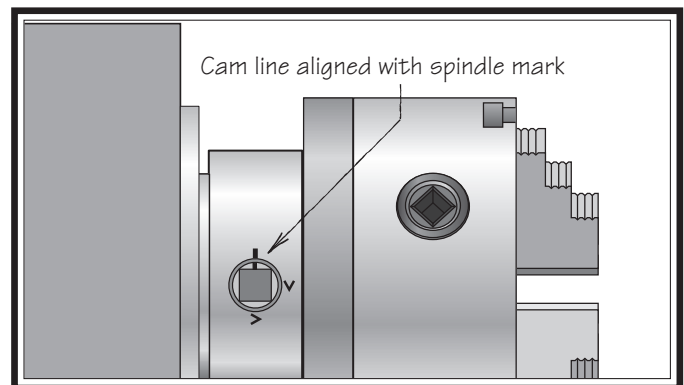
**Figure 40. Registration mark locations.**

## Chuck Removal

### To remove the chuck:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate lifting, support, or protective device to protect the ways and support the chuck.
3. Loosen the camlocks by turning the key counterclockwise until the cam lines are aligned with the mark on the spindle nose.

**Tip:** Camlocks can become very tight. A cheater pipe may be used as a last resort to add leverage when loosening. After loosening, you may need to wiggle the chuck key in the camlock to fully disengage the stud.



**Figure 41. Camlock is fully loosened when the cam line is aligned with the spindle mark.**

4. Using a dead blow hammer or other soft mallet, lightly tap around the outer circumference of the chuck body to loosen it from the spindle.
5. Remove the chuck from the spindle, using a light rocking motion to carefully slide the studs out of the bores.
  - If the chuck does not immediately come off, rotate it approximately 60° and tap it again. Make sure all the marks on the cams and spindle are in proper alignment for removal.

## Scroll Chuck Clamping 4-Jaw Chuck

This scroll-type chuck has an internal scroll-gear that moves all jaws in unison when adjusted with the chuck key. This chuck will hold cylindrical parts on-center with the axis of spindle rotation and can be rotated at high speeds if the workpiece is properly clamped and balanced.

### Never mix jaw types or positions to accommodate an odd-shaped workpiece.

The chuck will spin out of balance and may throw the workpiece! Instead, use an independent jaw chuck or a faceplate.

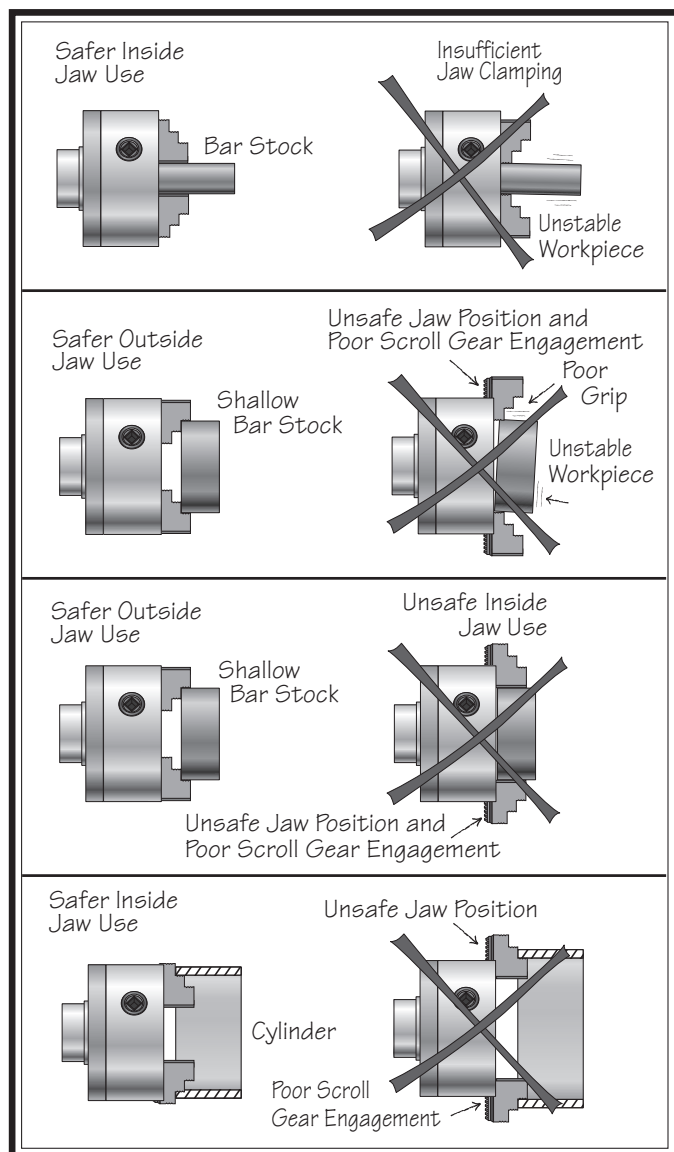


Figure 42. Jaw selection and workpiece holding.

Refer to the **Chuck Installation** (see **Page 35**) and **Chuck Removal** (see **Page 36**) instructions to install or remove the 4-jaw chuck.

The 4-jaw chuck features independently adjustable hardened steel jaws for holding non-concentric or off-center workpieces. Each jaw can be independently removed from the chuck body and reversed for a wide range of work holding versatility.

## ! WARNING

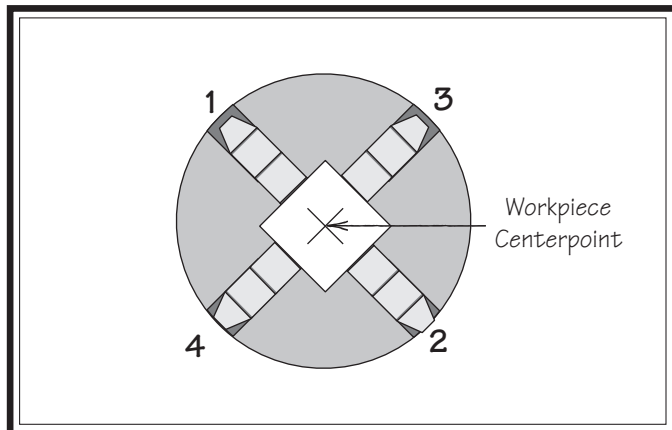
**Because of the dynamic forces involved in machining a non-concentric or off-center workpiece, always use a low spindle speed to prevent the workpiece from breaking loose and being thrown from the lathe, which could cause death or serious personal injury.**

## Mounting Workpiece

**To mount a workpiece on the 4-jaw chuck:**

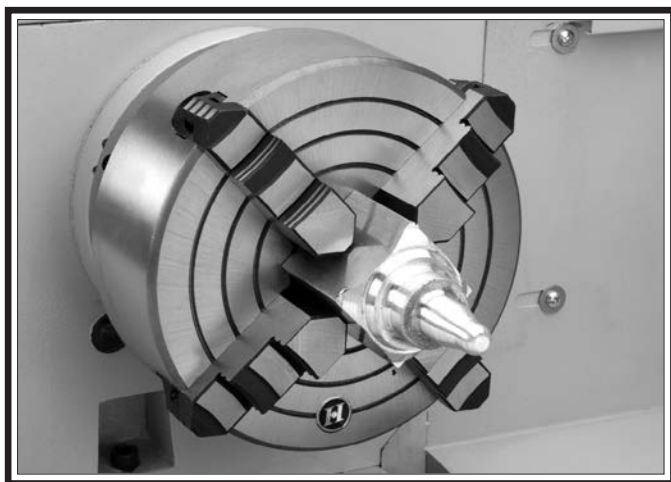
1. DISCONNECT LATHE FROM POWER!
2. Place a chuck cradle or plywood on the bedway below the chuck to protect the bedway surfaces.
3. Use the chuck key to open each jaw so the workpiece will lay flat against the chuck face, jaw steps, or into the spindle opening.
4. With the help from another person or a holding device, position the workpiece so it is centered in the chuck.

5. Tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening in an opposing sequence, as shown in **Figure 43**.



**Figure 43. 4-jaw tightening sequence.**

6. After the workpiece is held in place by the jaws, turn the chuck by hand and pay attention to the workpiece alignment.
- If the workpiece is not correctly aligned for your operation as you turn the chuck, make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is correctly aligned (see **Figure 44** for an example).



**Figure 44. Example photo of non-cylindrical workpiece correctly mounted on the 4-jaw chuck.**

## Faceplate

Refer to the **Chuck Installation (Page 35)** and **Chuck Removal (Page 36)** instructions to install or remove the faceplate.

The 12" faceplate included with your lathe offers a wide range of uses, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

The tools needed for mounting a workpiece will vary depending on the type of setup you have.

### **!WARNING**

**Machining non-concentric workpieces at a high speed could cause the workpiece to be thrown from the spindle with deadly force at the operator or bystanders. To reduce this risk, only machine non-concentric workpieces at low speeds and clamp counter-weights to the faceplate to balance it.**

### **!WARNING**

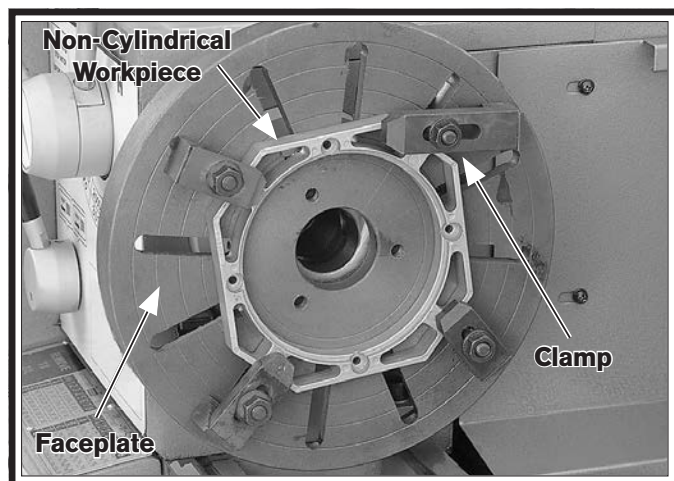
**Failure to properly secure a workpiece to the faceplate could cause the workpiece to be thrown from the lathe with deadly force at the operator or bystanders. Use a minimum of THREE independent clamping devices to hold the workpiece onto the faceplate.**



### To mount a non-concentric workpiece to the faceplate:

1. DISCONNECT LATHE FROM POWER!
2. Protect the bedway with a piece of plywood.
3. With the help from another person or a holding device to support the workpiece, position it onto the faceplate and clamp it in place with a minimum of three independent clamping devices (see **Figure 45** for an example).

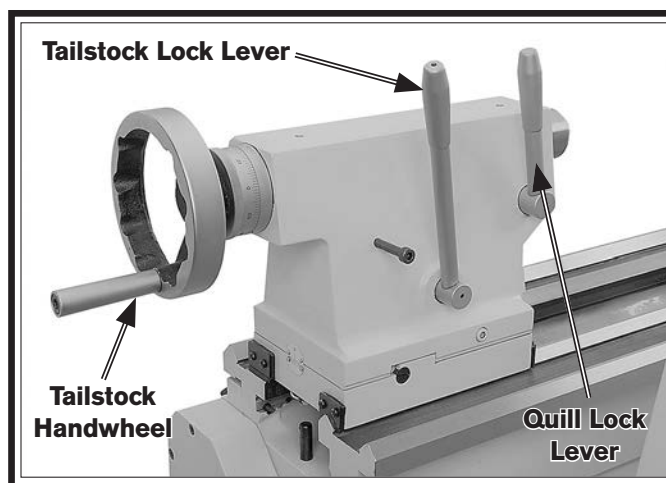
Be sure to take into account the rotational and cutting forces that will be applied to the workpiece when clamping it to the faceplate. If necessary, use counter-weights to balance the assembly.



**Figure 45.** Example photo of workpiece clamped in a faceplate.

## Tailstock

The tailstock (see **Figure 46**) is typically used to support long workpieces by means of a live or dead center (refer to **Centers** on **Page 43**). It can also be used to hold a drill or chuck to bore holes in the center of a part. Custom arbors and tapers can also be cut on your lathe by using the offset tailstock adjustment.



**Figure 46.** Tailstock and quill lock levers in locked position.

### Graduated Dial

Increments.....0.001"  
One Full Revolution.....0.100"

### Increments on Quill

Inch..... 0"-6" in 1/8" Increments  
Metric.....0-160mm in 1mm Increments

## Positioning Tailstock

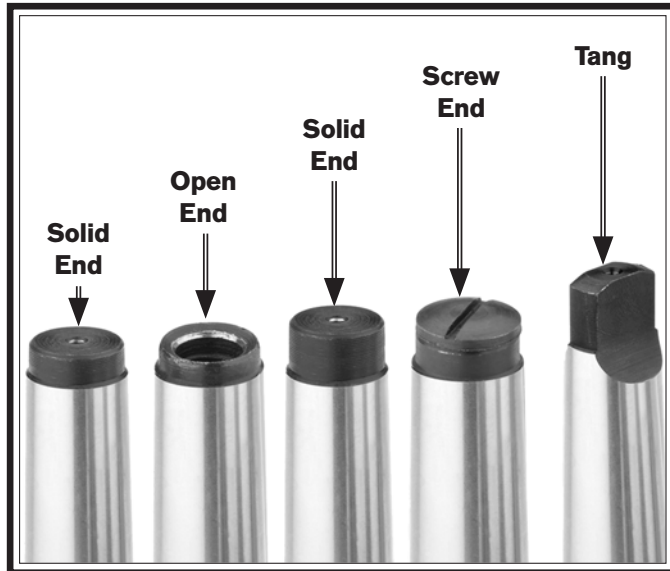
1. Pull the tailstock lock lever backward (away from the spindle) to unlock the tailstock from the bedway.
2. Slide the tailstock to the desired position.
3. Push the tailstock lock lever forward (toward the spindle) to lock the tailstock against the bedway.

## Using Quill

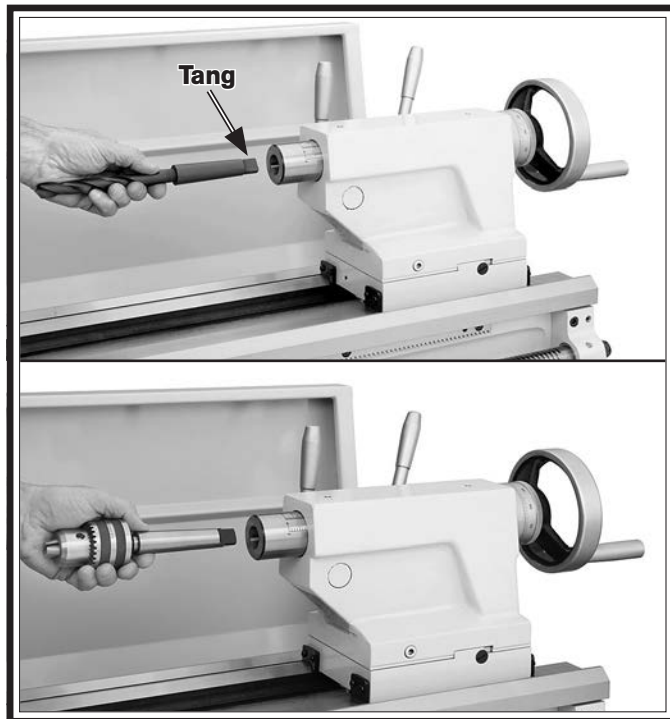
1. Release the quill lock lever.
2. Turn the tailstock handwheel clockwise to move the quill toward the spindle or counterclockwise to move it away from it.
3. Push the quill lock forward to lock the quill in place.

## Installing Tooling

This tailstock uses a quill with an MT#4 taper that has a lock slot in the back of the bore that accepts tang arbors and drill bits (see **Figures 47–48** for examples).



**Figure 47. Types of tapered arbors and tooling.**



**Figure 48. Example photos of inserting MT#4 tools with tangs into the tailstock.**

However, other tooling without tangs, such as the four remaining tools shown in **Figure 47**, can still be used if the potential load will not override the strength of the tapered fit. For example, smaller drill chucks, drill bits, and centers.

**Note:** If the tooling has an open hole in the end but is too short to be exposed in the drift slot for removal, then a screw can be threaded into the end of the tool to provide a solid surface for the quill pin to push against when the quill is retracted for tool removal.

### To install tooling in the tailstock:

1. With the tailstock locked in place, unlock the quill, then use the handwheel to extend it approximately 1".
  2. Thoroughly clean and dry the tapered mating surfaces of the quill and the center, making sure that no lint or oil remains on the tapers.
- Note:** If the tapered tool shaft has a tang, align it with the indent in the back of the quill before seating it.
3. With a firm and quick motion, insert the tool into the quill. Check to see if it is firmly seated by attempting to twist it—a firmly seated tool will not twist.
  4. Unlock the tailstock and move it until the tip of the tool is close to, but not touching, the workpiece, then re-lock the tailstock.
  5. Start spindle rotation, unlock the quill, then turn the tailstock handwheel clockwise to feed the tool into the workpiece.

## Removing Tooling

1. Use a shop rag to hold the tool.
2. Rotate the tailstock handwheel counterclockwise until the tool is forced out of the quill.

— If the tool does not come loose by retracting the quill, extend the quill and use a drift key in the slot shown in **Figure 49** to remove the tool.

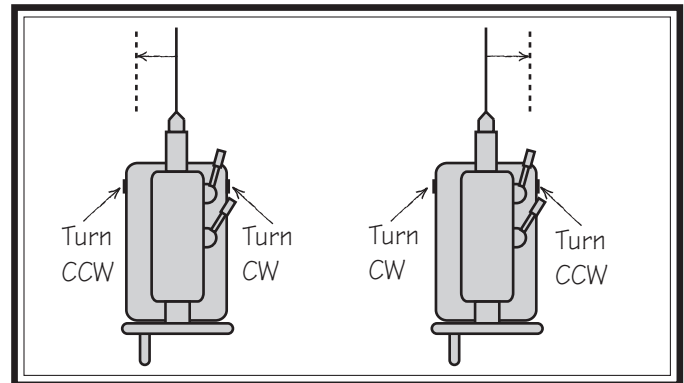


**Figure 49.** Drift key slot in the side of the quill.

## Offsetting Tailstock

The tailstock can be offset from the spindle centerline for turning tapers. Move the tailstock top casting toward the front of the lathe to machine a taper at the tailstock end. Conversely, position the tailstock top casting toward the back of the lathe to machine a taper at the spindle end (see the illustration in **Figure 50**).

**Note:** The marks on the offset indicator are arbitrary. For a precise offset, use a dial indicator to check quill movement while adjusting the screws.



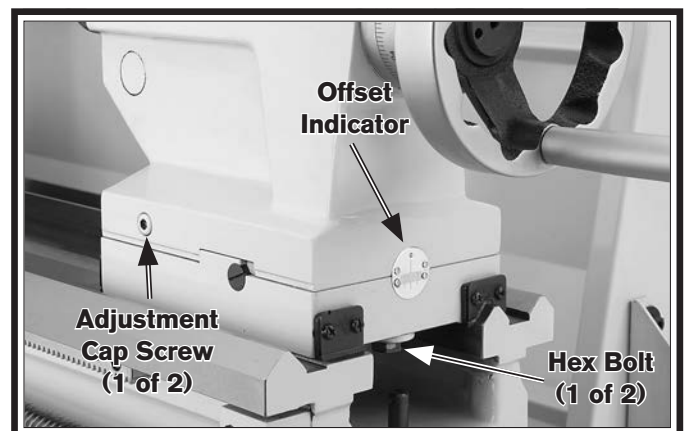
**Figure 50.** Set screw adjustment in relation to tailstock movement.

### Tools Needed

|                      | <b>Qty</b> |
|----------------------|------------|
| Hex Wrench 6mm ..... | 1          |
| Wrench 17mm .....    | 1          |

### To offset the tailstock:

1. Loosen the hex bolts underneath both ends of the tailstock to release the clamping pressure between the top and bottom castings (see **Figure 51**).



**Figure 51.** Tailstock offset controls.

2. Rotate the adjustment cap screws in opposite directions for the desired offset (see the illustration in **Figure 50**).
3. Retighten the clamping hex bolts underneath the tailstock to secure the offset.

3. Use the other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in **Figure 52**.

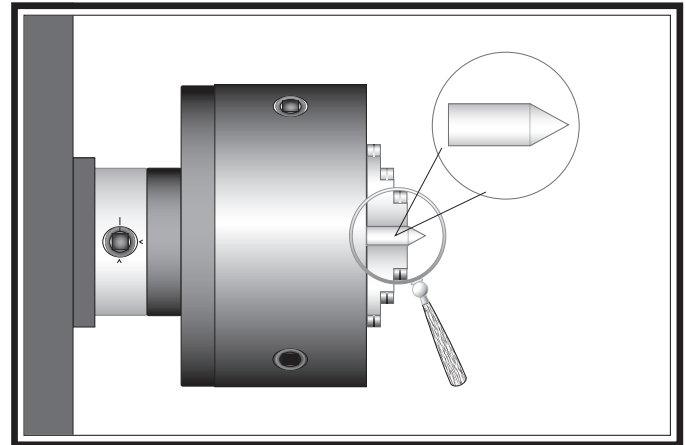
### Aligning Tailstock to Spindle Centerline

This is an essential adjustment that should be verified or performed each time the tailstock is used to turn concentric workpieces between centers or immediately after offsetting the tailstock when turning a taper. If the tailstock is not aligned with the spindle centerline when it is supposed to be, turning results will be inaccurate along the length of the workpiece.

| <b>Items Needed</b>       | <b>Qty</b> |
|---------------------------|------------|
| Hex Wrench 6mm .....      | 1          |
| Wrench 17mm .....         | 1          |
| Round Stock 2" x 6" ..... | 2          |
| Precision Level .....     | 1          |

#### To align the tailstock offset to the spindle centerline:

1. Use the precision level to make sure the bedway is level from side-to-side and from front-to-back.
  - If the bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling & Mounting on Page 24**).
2. Center drill both ends of one piece of round stock, then set it aside for use in **Step 5**.



**Figure 52. Turning a dead center.**

**Note:** As long as this dead center remains in the chuck, the point of the center will remain true to the spindle centerline. The point will have to be refinished whenever the center is removed and then returned to the chuck.

4. Install a center in the tailstock.
5. Attach a lathe dog to the test stock from **Step 2**, then mount it between the centers (see **Figure 53** for an example).

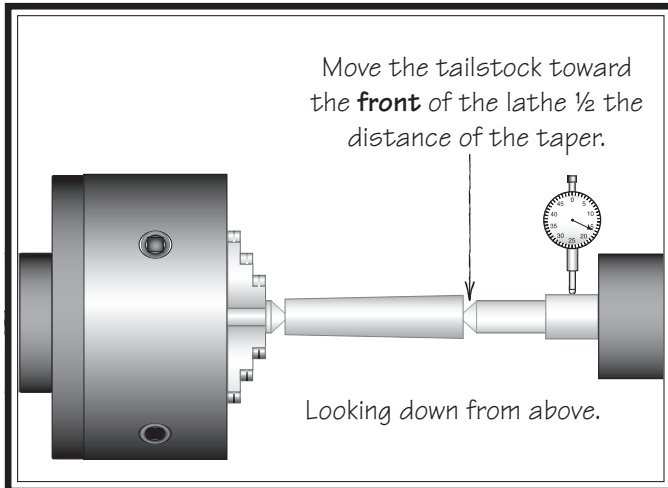


**Figure 53. Example photo of stock mounted between the centers.**

6. Turn 0.010" off the stock diameter.
7. Mount a test or dial indicator so that the plunger is on the tailstock quill.

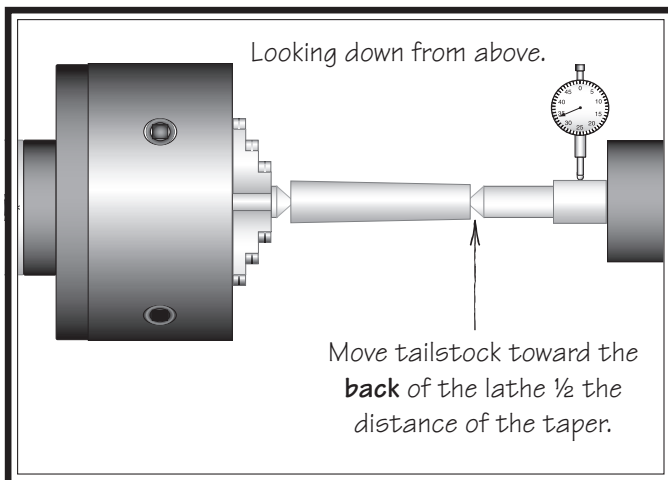
**Note:** If necessary in the following step, refer to **Offsetting Tailstock** on **Page 41** for detailed instructions.

8. Use calipers to measure both ends of the workpiece.
  - If the test stock is *thicker* at the tailstock end, move the tailstock toward the *front* of the lathe  $\frac{1}{2}$  the distance of the amount of taper (see **Figure 54**).



**Figure 54. Adjust tailstock toward the operator.**

- If the test stock is *thinner* at the tailstock end, move the tailstock toward the *back* of the lathe  $\frac{1}{2}$  the distance of the amount of taper (see **Figure 55**).

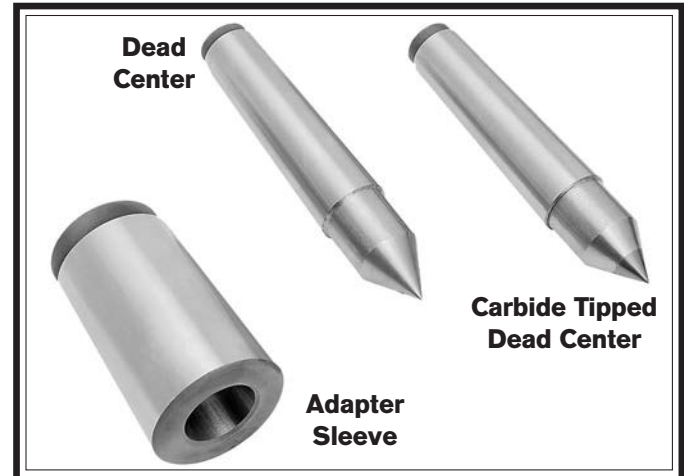


**Figure 55. Adjust tailstock away from the operator.**

9. Repeat **Steps 6–8** until the desired accuracy is achieved.

## Centers

**Figure 56** shows the MT#4 dead centers included with the lathe. In addition, an MT#6–MT#4 tapered spindle sleeve is included for mounting centers in the spindle.



**Figure 56. Adapter sleeve and dead centers.**

### Dead Centers

A dead center is a one-piece center that does not rotate with the workpiece and is used to support long, slender workpieces

Use the dead center in the spindle, where the workpiece rotates with the center and does not generate friction.

The carbide-tipped dead center can better withstand the effects of friction and is best used in the tailstock where the workpiece will rotate against it and generate friction. The tip of the center must be generously lubricated to avoid premature wear and maximize smooth operation. Using low spindle speeds will also reduce the heat and wear from friction.

## Live Centers

A live center has bearings that allow the center tip and the workpiece to rotate together; it can be installed in the spindle and the tailstock quill for higher speeds. However, a live center typically does not provide the same level of rigidity as a dead center, and final workpiece accuracy can suffer as a result.

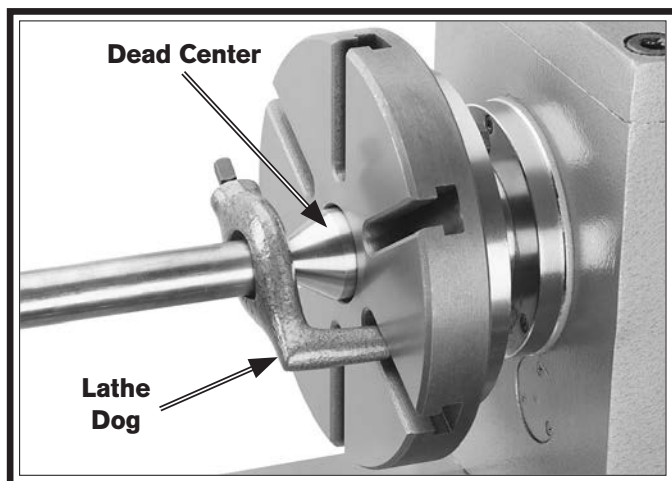
## Mounting Dead Center in Spindle

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean and dry the tapered mating surfaces of the spindle bore, adapter sleeve, and the center, making sure that no lint or oil remains on the tapers.

**Note:** This will prevent the tapered surfaces from seizing due to operational pressures, which could make it very difficult to remove the center.

3. Mount a chuck or faceplate onto the spindle, whichever is correct for your operation.
4. Insert the center into the sleeve, then insert the sleeve into the spindle bore through the chuck or faceplate.

**Figure 57** shows an example photo of a dead center installed in the spindle, using a lathe dog and faceplate for turning between centers.



**Figure 57.** Example photo of using a dead center with a faceplate and lathe dog.

## Removing Center from Spindle

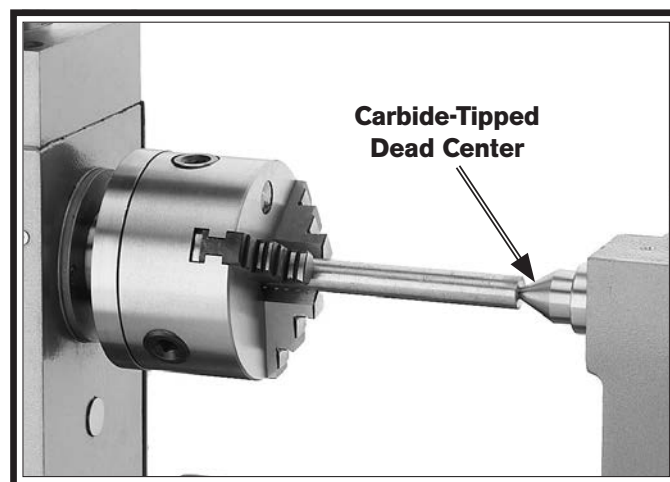
To remove the sleeve and center from the spindle, insert a piece of round bar stock or similar tool through the outboard end (on the left side of the headstock). Have another person hold onto the sleeve and center with a gloved hand or shop rag, then tap the sleeve loose.

## NOTICE

To avoid premature wear of the dead center or damage to the workpiece, use low spindle speeds and keep the tip of the dead center mounted in the tailstock well lubricated.

## Mounting Center in Tailstock

Either a carbide-tipped dead center or live center can be used in the tailstock. Mounting instructions are the same for both. **Figure 58** shows an example photo of a dead center mounted in a tailstock.



**Figure 58.** Example photo of using a carbide-tipped dead center installed in the tailstock.

### To mount a center in the tailstock:

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean and dry the tapered mating surfaces of the tailstock quill bore and the center, making sure that no lint or oil remains on the tapers.

3. Use the tailstock handwheel to feed the quill out from the casting approximately 1".

**Note:** Do not extend the quill more than 2" or stability and accuracy will be reduced.

4. Insert the center into the tailstock quill.
5. Seat the center firmly into the quill during workpiece installation by rotating the quill handwheel clockwise to apply pressure, with the center engaged in the center hole in the workpiece.

**Note:** Only apply enough pressure with the tailstock quill to securely mount the workpiece between centers. Avoid overtightening the center against the workpiece, or it may become difficult to remove later, and it will result in excessive friction and heat, which may damage the workpiece and center.

## Removing Center from Tailstock

To remove the center from the quill, hold onto it with a gloved hand or shop rag, then rotate the tailstock handwheel counterclockwise to draw the quill back into the casting until the center releases.

If the center does not come loose by retracting the quill, extend the quill to expose the slot shown in **Figure 59**, then use a drift key to remove the center.



Figure 59. Drift key slot in the side of the quill.

## Mounting Workpiece Between Centers

1. DISCONNECT LATHE FROM POWER!
2. Drill center holes in both ends of the workpiece.
3. Install a dead center in the spindle with a lathe dog and a chuck or faceplate, then install a live center or carbide-tipped dead center in the tailstock.
4. Lubricate the workpiece center holes, then mount the workpiece between the centers and hold it in place with light pressure from the tailstock center.
5. Seat the center firmly into the quill by rotating the tailstock handwheel clockwise to apply pressure against the workpiece (see the example in **Figure 60**).

Only apply enough pressure to securely mount the workpiece between centers. Avoid over-tightening the center against the workpiece, or it may become difficult to remove later. Also, over-tightening will result in excessive friction and heat, which may damage the workpiece or center.

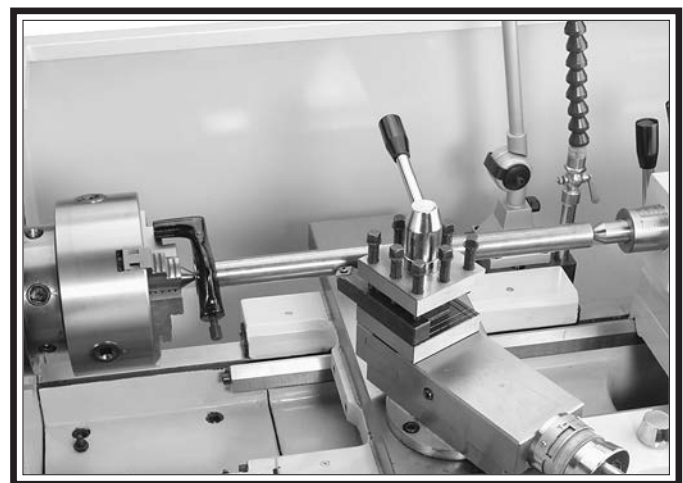
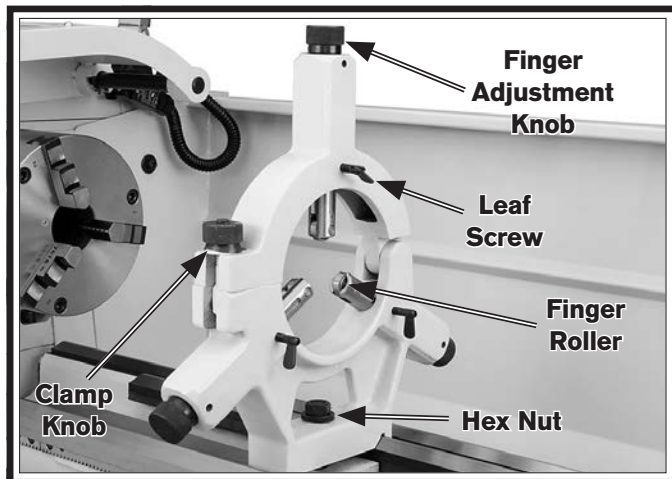


Figure 60. Example photo of a workpiece mounted between the centers.

## Steady Rest

The steady rest supports long shafts and can be mounted anywhere along the length of the bedway.

Familiarize yourself with the steady rest components shown in **Figure 61** to better understand its operation.

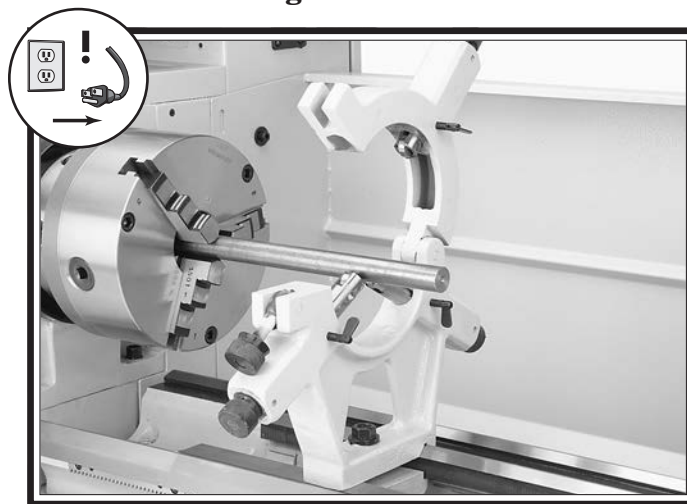


**Figure 61. Steady rest components.**

### To install and use the steady rest:

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean all mating surfaces, then place the steady rest base on the bedways so the triangular notch fits over the bedway prism.
3. Position the steady rest where required to properly support the workpiece, then tighten the hex nut shown in **Figure 61** to secure it in place.

4. Loosen the clamp knob that secures the two halves of the rest and open the top portion, as shown in **Figure 62**.



**Figure 62. Workpiece mounted in the steady rest.**

5. Loosen the three leaf screws so the finger roller positions can be adjusted.
  6. Use the finger adjustment knobs to position the bottom two finger rollers against the workpiece, as shown in the example of **Figure 62**.
  7. Close the steady rest, then use the finger adjustment knobs to adjust all three finger rollers so that they just touch the workpiece without causing deflection.
- Note:** The finger rollers should properly support the workpiece along the spindle centerline while still allowing it to freely rotate.
8. Tighten the three leaf screws to secure the settings.



## Follow Rest

The follow rest mounts to the saddle with two cap screws (see **Figure 63**). It is used on long, slender parts to prevent workpiece deflection from the pressure of the cutting tool during operation. Adjust the follow rest fingers in the same manner as the those on the steady rest.

**Note:** To reduce the effects of friction, lubricate the brass finger tips with generous lubricant during operation.

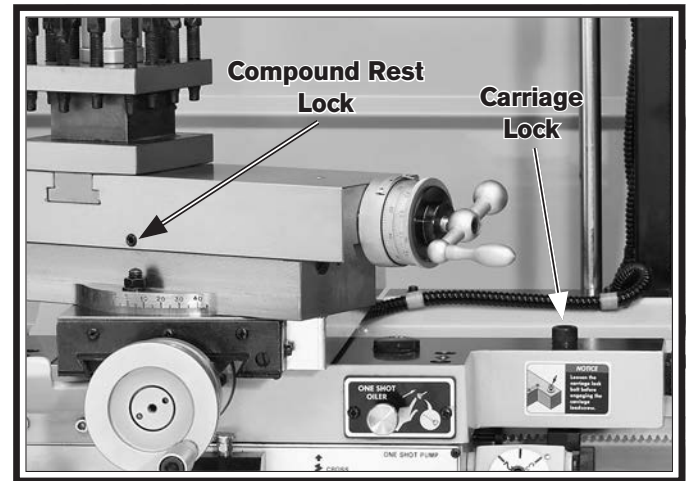


**Figure 63. Follow rest attachment.**

## Carriage & Compound Rest Locks

The carriage and compound rest have locks that can be tightened to provide additional rigidity during operation, especially during heavy cuts.

See **Figure 64** to identify the locations of the locks for each device.



**Figure 64. Locations of compound rest and carriage locks.**

# Compound Rest

The compound rest handwheel has an indirect-read graduated scale. This means that the distance shown on the scale represents the actual distance the cutting tool moves. The base of the compound rest has another graduated scale used for setting the cutting tool to a specific angle.

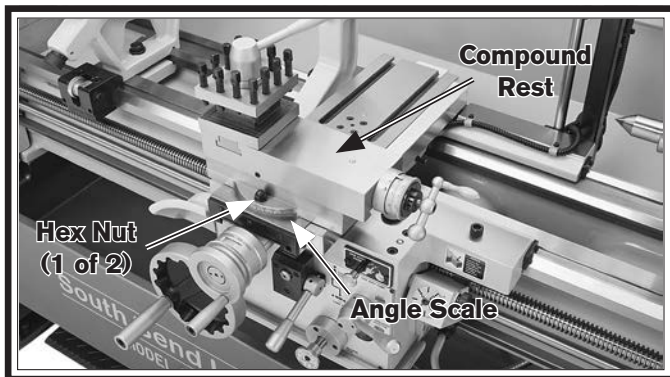
### Graduated Dial

Increments.....0.001" (0.02mm)  
 One Full Revolution.....0.100" (2.54mm)

| Tool Needed       | Qty |
|-------------------|-----|
| Wrench 14mm ..... | 1   |

### To set the compound rest at a certain angle:

1. Loosen the two hex nuts at the base of the compound rest (1 of 2 shown in **Figure 65**).



**Figure 65. Compound rest.**

2. Rotate the rest to the desired angle, as indicated by the scale at the base, then retighten the two hex nuts.

**Tip:** The first time you set the angle of the compound rest for cutting threads, mark the location on the cross slide as a quick reference point. This will allow you to quickly return the compound rest to that exact angle the next time you need to cut threads.

# Four-Way Tool Post

The four-way tool post is mounted on top of the compound rest and allows a maximum of four tools to be loaded simultaneously.

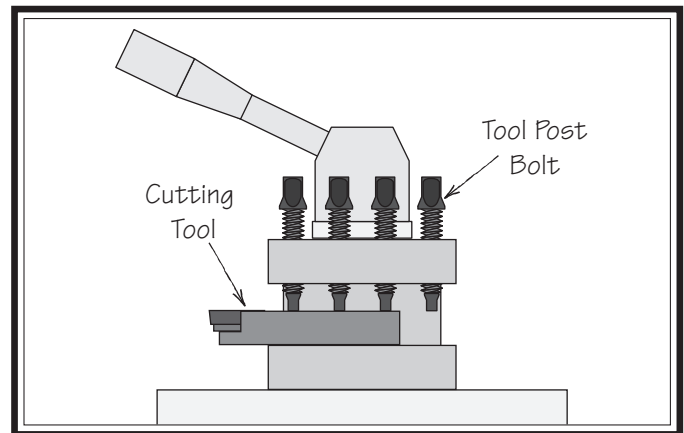
Each tool can be quickly indexed to the workpiece by loosening the top handle, rotating the tool post to the desired position, then re-tightening the handle to lock the tool into position.

### Installing Tool

| Tool Needed             | Qty |
|-------------------------|-----|
| Tool Post T-Wrench..... | 1   |

### To load the tool post:

1. Adjust the tool post bolts so that the cutting tool can fit underneath them (see **Figure 66**).



**Figure 66. Example of tool mounted in tool post.**

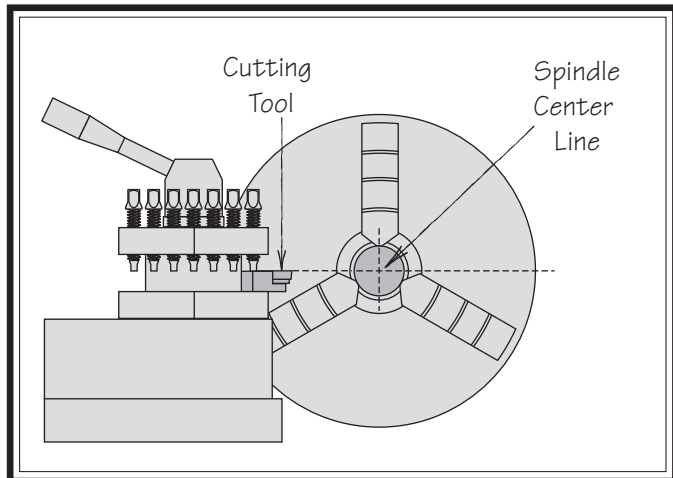
## **!WARNING**

**Over-extending a cutting tool from the post will increase the risk of tool chatter, breakage, or loosening the tool during operation, which could cause metal pieces to be thrown at the operator or bystanders with great force. DO NOT extend a cutting tool more than 2.5 times the width of its cross-section or less (e.g, 2.5 x 0.5" = 1.25").**

2. Firmly secure the cutting tool with at least two tool post bolts.
3. Check and adjust the cutting tool to the spindle centerline, as instructed in the next subsection.

## Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned with the spindle centerline, as illustrated in **Figure 67**.



**Figure 67. Cutting tool aligned with spindle centerline (viewed from tailstock).**

There are a number of ways to check and align the cutting tool to the spindle centerline. If necessary, you can raise the cutting tool by placing steel shims underneath it. The shims should be as long and as wide as the cutting tool to properly support it.

### Below are two common methods:

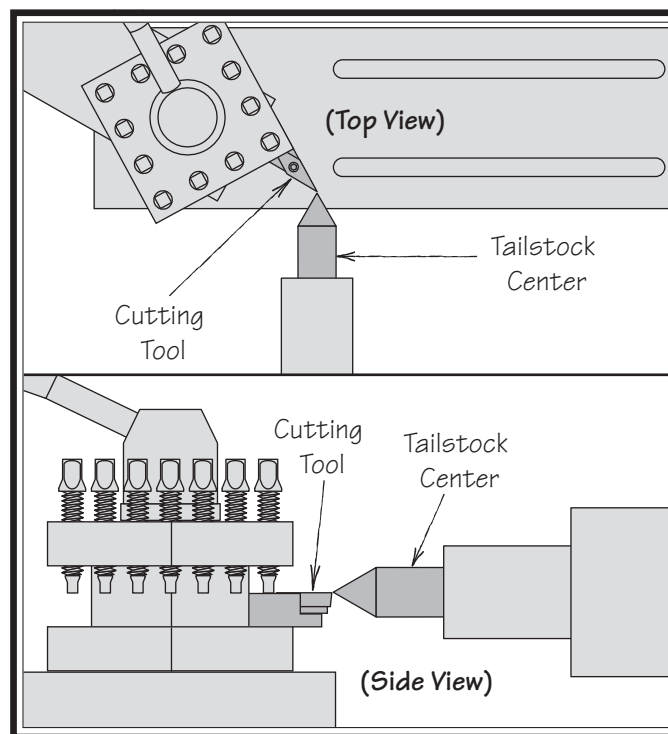
- Align the tip of the cutting tool with a center installed in the tailstock, as instructed on the next page. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 42** for detailed instructions).
- Make a facing cut on a piece of round bar stock. If the tool is above or below the spindle centerline, a nub will be left in the center of the workpiece. Adjust the height of the tool, then repeat the facing cut to check the adjustment. Repeat as necessary until the center of the workpiece face is smooth.

### Tools Needed

|                         | Qty       |
|-------------------------|-----------|
| Tool Post T-Wrench..... | 1         |
| Steel Shims.....        | As Needed |
| Cutting Tool.....       | 1         |
| Fine Ruler.....         | 1         |
| Tailstock Center.....   | 1         |

### To align the cutting tool with the tailstock center:

1. Mount the cutting tool in the tool post, then secure the post so the tool faces the tailstock.
2. Install a center in the tailstock, and position the center tip near the cutting tool tip.
3. Lock the tailstock and quill in place.
4. Adjust the height of the cutting tool so that the tool tip is aligned vertically and horizontally with the center tip, as shown in **Figure 68**.



**Figure 68. Cutting tool tip aligned with tailstock center.**

## Adjustable Feed Stop

This machine features an adjustable stop system that can be used to stop the carriage at a pre-set location when it is being driven by the feed rod. This system consists of an adjustable collar on the feed rod, a stop plate on the apron, and the feed rod clutch (see **Figure 69**). The collar can be secured anywhere along the feed rod. When the stop plate contacts the collar, the feed rod clutch disengages the feed rod and stops carriage movement.

**Note:** This system only works when the carriage is engaged with the feed rod—it cannot be used to stop the carriage if it is engaged with the leadscrew.

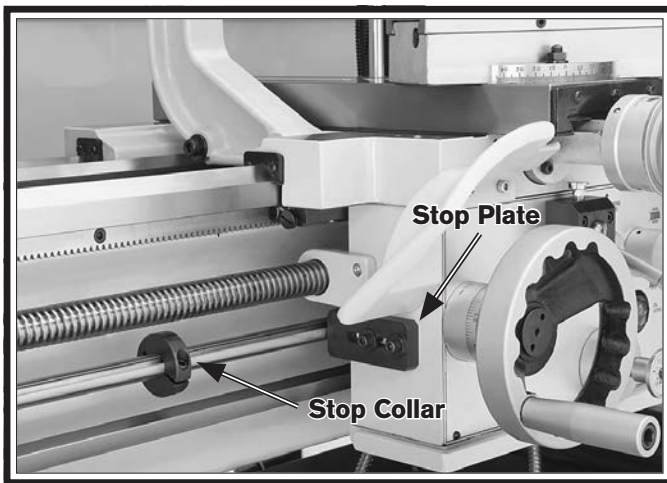


Figure 69. Adjustable feed rod stop.

### NOTICE

The adjustable feed stop system will only stop carriage movement if the carriage is engaged with the feed rod.

When the carriage is engaged with the leadscrew for threading operations, the adjustable feed stop system **WILL NOT** stop carriage movement—you must use the half nut lever instead. Otherwise, the carriage can crash into the chuck, or if it contacts the stop, the leadscrew shear pin will break.

Before doing any threading operations, make sure to loosen the feed stop collar so it slides freely on the feed rod and will not interfere with carriage travel.

## Micrometer Stop

The micrometer stop used to limit carriage travel for production runs or make final adjustments to the carriage position. To ensure accuracy with repeatable operations, the operator must ensure that carriage contact is done in a soft and careful manner. *The micrometer stop should never be used as a stop for power feeding operations.*

### NOTICE

The micrometer stop is not designed to stop carriage movement when the leadscrew or feed rod is engaged—doing so may damage the micrometer stop or lathe components.

#### Tools Needed

Hex Wrench 8mm ..... 1

#### Graduated Dial

Increments.....0.001"  
One Full Revolution.....0.050"

#### To set the micrometer stop:

1. DISCONNECT LATHE FROM POWER!
2. Loosen the cap screws shown in **Figure 70**, then use the carriage handwheel to position the carriage and cutting tool at the desired stopping point.

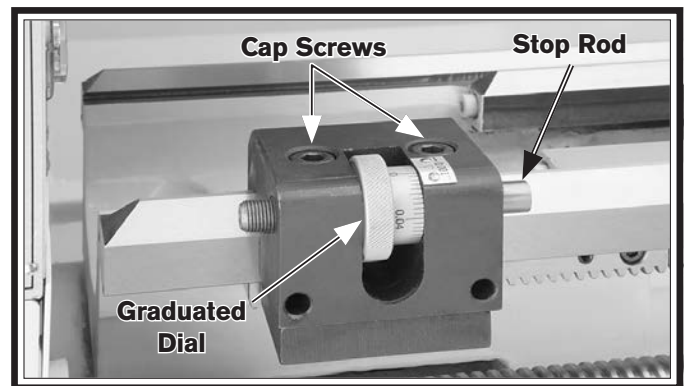


Figure 70. Micrometer stop.

3. Move the micrometer stop up to the carriage, use the graduated dial to fine tune the position, then retighten the cap screws loosened in **Step 2**.
4. Verify that tooling will not make contact with chuck, jaws, or other components.

## Manual Feed

The handwheels shown in **Figure 71**, and described below, allow the operator to manually move the cutting tool.

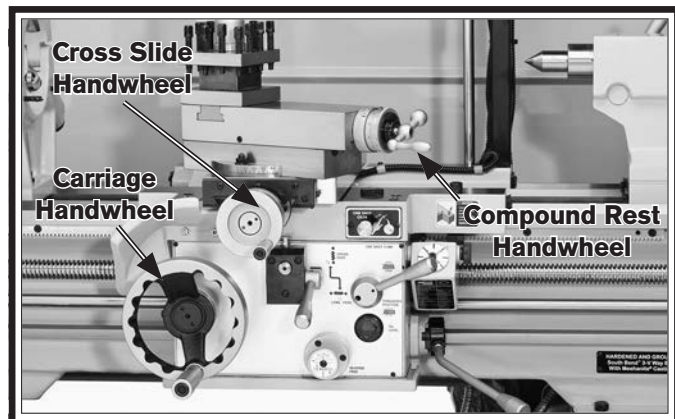


Figure 71. Carriage Controls.

### Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.01" increments, and one full revolution moves the carriage 0.80".

### Cross Slide Handwheel

The cross slide handwheel moves the tool toward and away from the work. Adjust the position of the graduated scale by holding the handwheel with one hand and turning the dial with the other. The cross slide handwheel has a direct-read graduated dial, which shows the total amount of material removed from the diameter of the workpiece (i.e., half the amount of tool movement). The dial has 0.001" (0.02mm) increments, and one full revolution moves the slide 0.100" (5.08mm). Rotate the dial collar 180° to read in metric units.

### Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the compound rest. (The compound rest angle is set by hand-rotating it and securing in place with two hex nuts.) The compound rest has an indirect-read graduated dial with 0.001" (0.02mm) increments. One full revolution of the handwheel moves the slide 0.100" (2.54mm). Rotate the dial collar 180° to read in metric units.

## Spindle Speed

Using the correct spindle speed is important for safe and satisfactory results, as well as maximizing tool life.

To set the spindle speed for your operation, you will need to: 1) Determine the best spindle speed for the cutting task, and 2) configure the lathe controls to produce the required spindle speed.

### Determining Spindle Speed

Many variables affect the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 72**.

|   |
|---|
| <p>*Recommended<br/>Cutting Speed (FPM) x 12</p> <hr/> <p>Dia. of Cut (in inches) x 3.14</p> <p>= SpindleSpeed (RPM)</p> <p>*Double if using carbide cutting tool</p> |
|---|

Figure 72. Spindle speed formula for lathes.

Cutting speed, typically defined in feet per minute (FPM), is the speed at which the edge of a tool moves across the material surface.

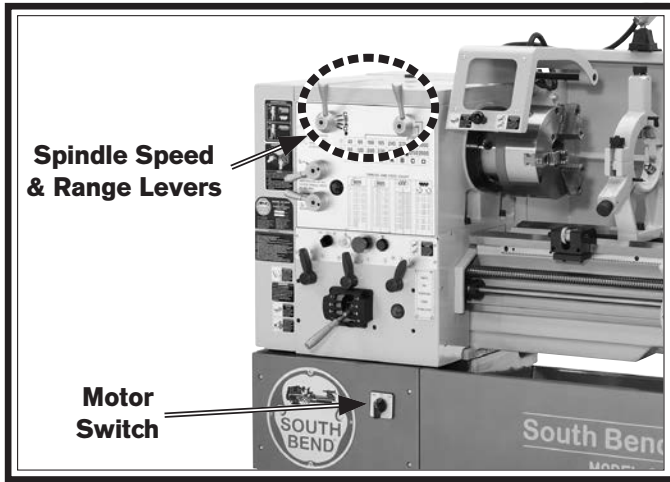
A recommended cutting speed is an ideal speed for cutting a type of material in order to produce the desired finish and optimize tool life.

The books **Machinery's Handbook** or **Machine Shop Practice**, and some internet sites, provide excellent recommendations for which cutting speeds to use when calculating the spindle speed. These sources also provide a wealth of additional information about the variables that affect cutting speed and they are a good educational resource.

Also, there are a large number of easy-to-use spindle speed calculators that can be found on the internet. All of these sources will help you take into account all the applicable variables in order to determine the best spindle speed for the operation.

## Setting Spindle Speed

Selecting one of the 16 spindle speeds available is a combination of configuring the two-speed motor switch, the spindle range lever, and the spindle speed lever shown in **Figure 73**.



**Figure 73. Spindle speed controls.**

The spindle speed and range levers control the gear configuration in the headstock to produce the selected spindle speed. The spindle range lever selects speeds in the low or high range to be available for the spindle speed lever. The spindle speed lever selects one of the speeds available in the active spindle speed range.

### **NOTICE**

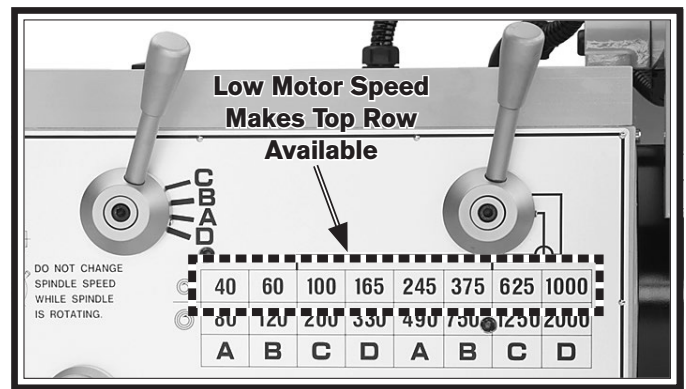
**Never change spindle speeds while spindle is moving! Severe machine damage will occur.**

## Configuration Examples

Use the following examples to better understand how to read the spindle speed chart and configure the controls for the correct speed.

### Example 1: Spindle Speed of 40 RPM

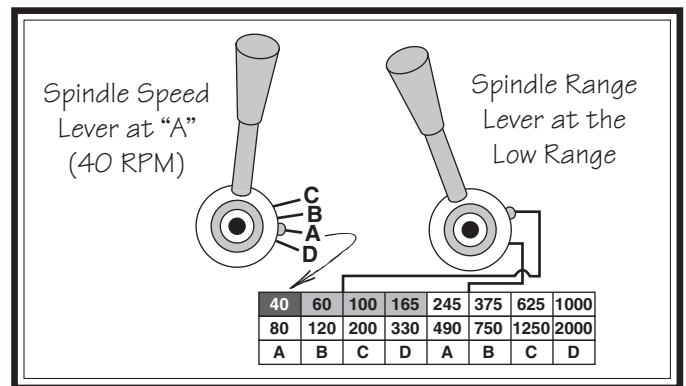
1. Make sure the spindle is completely stopped and the spindle ON/OFF lever is in the OFF (middle) position.
2. Turn the motor switch to the LOW (left) position. This will make the speeds in the top row of the spindle speed chart available (see **Figure 74**).



**Figure 74. A low motor speed makes the spindle speeds in the top row of the chart available.**

3. Move the spindle range lever so that the indicator points to the upper line (see the illustration in **Figure 75**). This will make the first four or lower speeds in the top row of the chart available.

**Note:** If necessary, use the chuck key to rock the spindle back-and-forth to help mesh the gears as you move the levers.

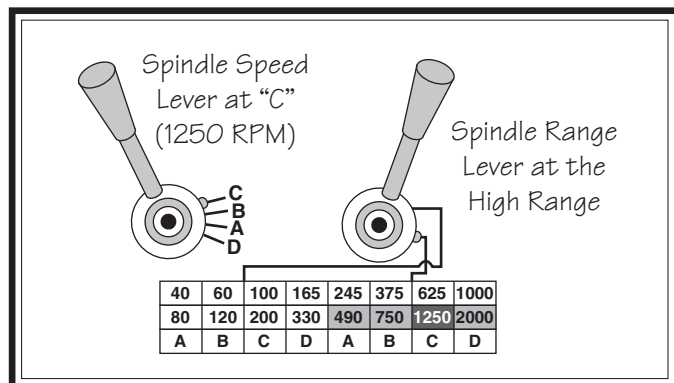


**Figure 75. Setting the spindle speed at 40 RPM.**

4. Move the spindle speed lever so that the indicator points to the letter "A". This will select the spindle speed of 40 RPM in the top row of the chart.

### Example 2: Spindle Speed of 1250 RPM

1. Make sure the spindle is completely stopped and the spindle ON/OFF lever is in the OFF (middle) position.
2. Turn the motor switch to the HIGH (right) position. This will make the speeds in the bottom row of the spindle speed chart available
3. Move the spindle range lever so that the indicator points to the lower line (see **Figure 76**). This will make the last four or higher speeds in the bottom row available.



**Figure 76. Setting the spindle speed at 1250 RPM.**

4. Move the spindle speed lever so that the indicator points to the letter "C". This will select the spindle speed of 1250 RPM in the bottom row of the chart.

## Power Feed

Both the carriage and cross slide have power feed capability when the carriage is engaged with the feed rod. The rate that these components move (feed rate) is controlled by how the levers are positioned on the headstock and quick-change gearbox, and the end gear arrangement.

Feed rate and spindle speed must be considered together. Keep in mind that the feed rate is expressed in the amount of travel per revolution of the spindle. The sources you use to determine the optimum spindle speed for an operation will also provide the optimal feed rate to use with that spindle speed.

Often, the experienced machinist will use the feeds and speeds given in their reference charts or web calculators as a starting point, then make minor adjustments to the feed rate (and sometimes spindle speed) to achieve the best results.

The carriage can alternatively be driven by the leadscrew for threading operations. However, this section only covers the use of the power feed option for the carriage and cross slide components for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading** on **Page 58**.

### NOTICE

**To avoid damaging the machine, NEVER attempt to engage carriage with leadscrew and feed rod at the same time!**

### NOTICE

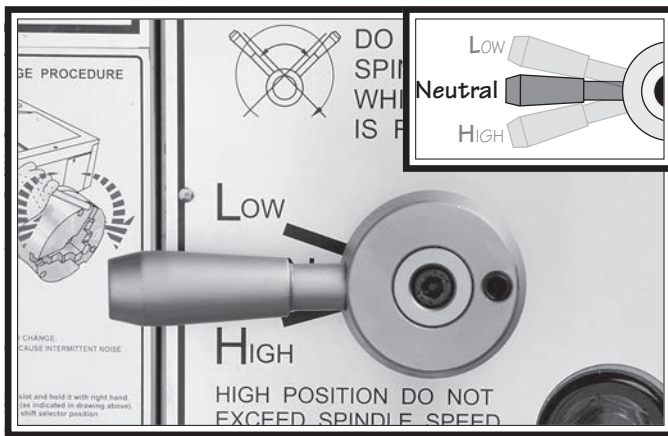
**Never change spindle speeds while spindle is moving! Severe machine damage will occur.**

## Power Feed Controls

Use **Figures 77–80** and the following descriptions to become familiar with the locations and functions of the controls that you will use to set up the correct power feed for your operation.

**Note:** Before using power feed, you may have to re-configure the end gears, depending on how they are set up. Refer to **End Gears** on **Page 56** for detailed instructions.

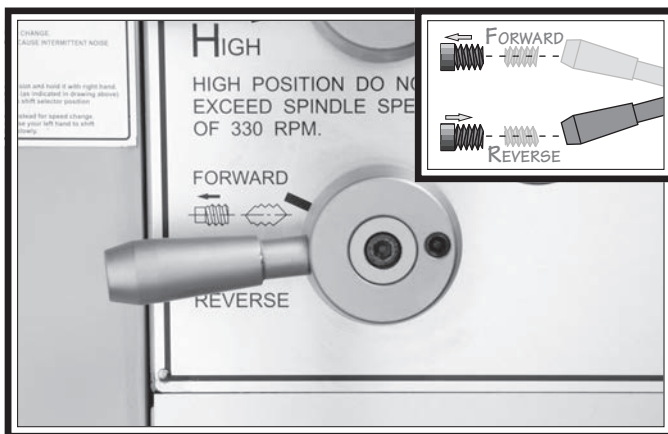
**Feed Range Lever:** Selects the low or high feed rate range by re-aligning the headstock transfer gear. In the middle position, disables power feed (see **Figure 77**).



**Figure 77. Feed range lever.**

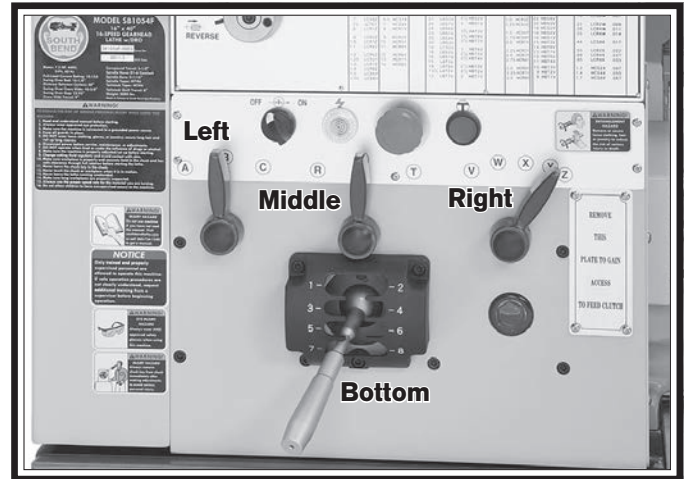
**Feed Direction Lever:** Selects the direction of power feed (see **Figure 78**).

**Note:** The spindle must be stopped to use this lever. When the lathe is running, use the quick-change feed direction knob on the apron.



**Figure 78. Feed direction lever in the neutral position.**

**Quick-Change Gearbox Feed Levers:** Configure the quick-change gearbox gears for the feed rate selected (see **Figure 79**).



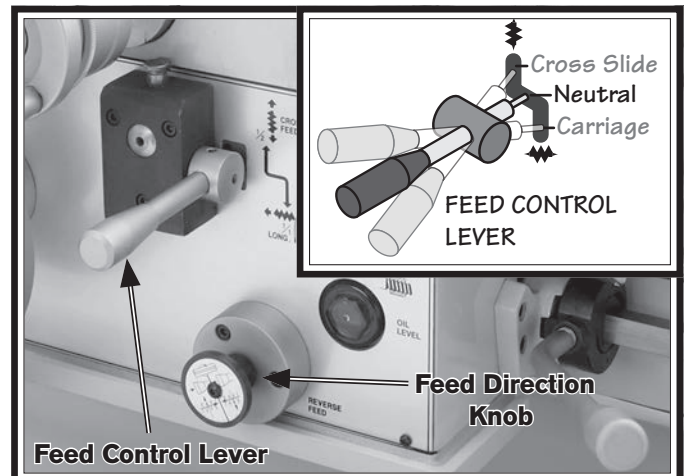
**Figure 79. Quick-change gearbox levers.**

**Feed Control Lever:** Directs the power feed to either the cross slide or the carriage (see **Figure 80**).

When the lever is down and the indent pin is pointing up, the cross slide is selected. Conversely, when the lever is up and the pin is pointing down, the carriage is selected.

In the middle position, the apron gears are disengaged from the feed rod and neither component will move.

**Note:** When using this lever, you may need to slightly rotate the handwheel of the component you are trying to engage, so that the apron gears can mesh.



**Figure 80. Apron power feed controls.**



**Feed Direction Knob:** Changes power feed direction (see **Figure 80**).

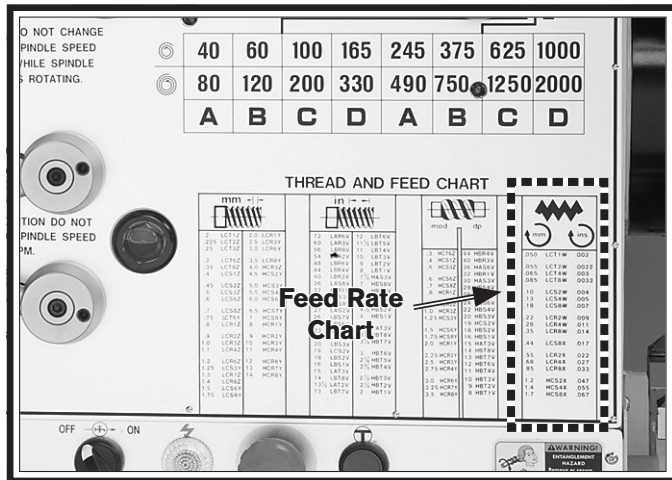
The advantage of this knob is that you can quickly reverse power feed direction while the spindle is rotating—without having to turn the lathe off, wait until the spindle is stopped, then use the feed direction lever on the headstock.

**NOTICE**

**Depending on the combined configuration of the feed direction lever on the headstock and the feed direction knob on the apron, the actual direction of power feed may be different from the printed indicators on the machine!**

### Setting Feed Rate

The feed rate chart displays the settings for the headstock feed controls for metric and inch feed rates (see **Figure 81**).

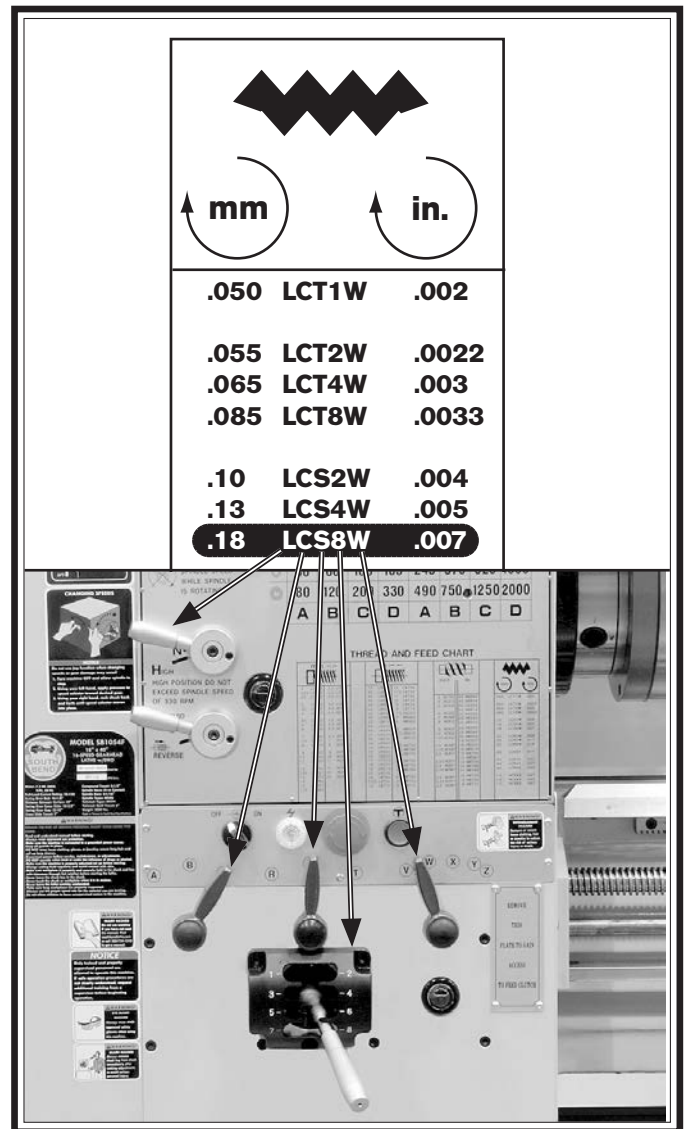


**Figure 81. Power feed rate chart.**

Using the controls on the lathe, follow along with the example below to better understand how to set the lathe for the desired power feed rate.

### Example: Power Feed Rate of 0.18mm/rev

1. Make sure the end gears are in the standard configuration, which is applicable for general feed operations (refer to **End Gears** on the **Page 56** for detailed instructions).
2. Locate the line in the feed rate chart that lists the setting for 0.18mm of feed per revolution of the spindle, as illustrated in **Figure 82**.



**Figure 82. Relationships between feed rate chart and headstock feed controls.**

3. The configuration string of characters to the right of the selected feed rate (LCS8W) displays the positions to set the feed controls for a feed rate of 0.18mm/rev.
4. Position the controls as indicated in the following instructions. If needed, use the chuck key to rock the spindle back-and-forth to help mesh the gears as you make adjustments.
  - a) Move the feed range lever to the low (L) position.
  - b) Point the left gearbox lever to the "C".
  - c) Move the middle gearbox lever to the "S".
  - d) Position the bottom gearbox lever in the "8" slot.
  - e) Point the right gearbox lever to the "W".

The lathe is now set up for a power feed rate of 0.18mm per spindle revolution.

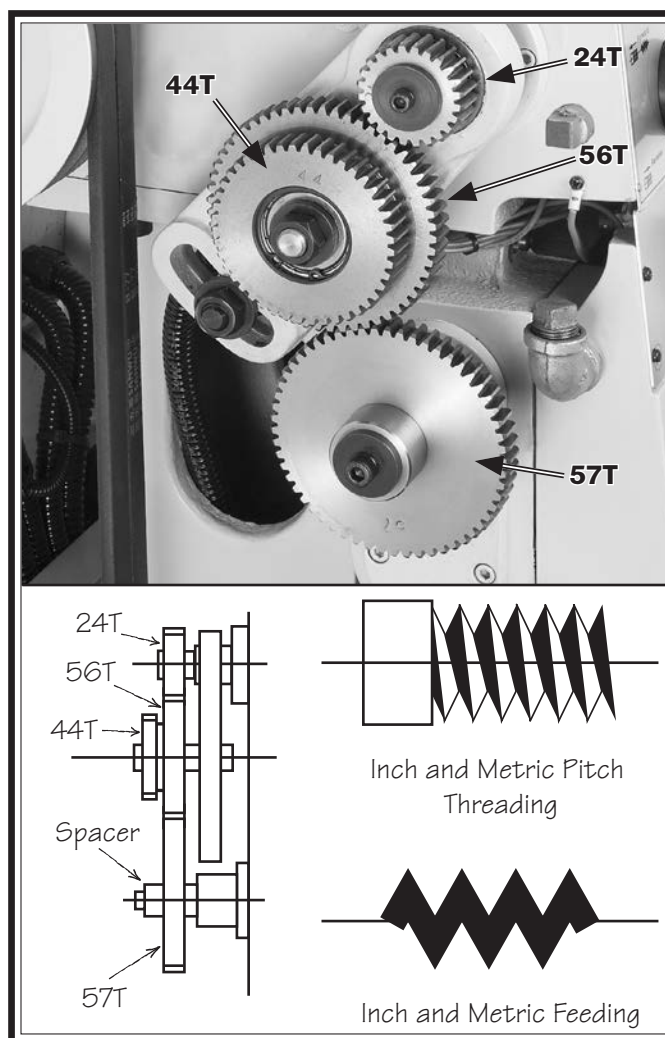
## End Gears

The end gears on the side of the headstock can be setup for the standard or alternate configuration, depending upon the type of operation to be performed. The lathe is shipped with the end gears in the standard configuration.

To access the end gears, remove the end gear cover from the left side of the headstock

### Standard End Gear Configuration

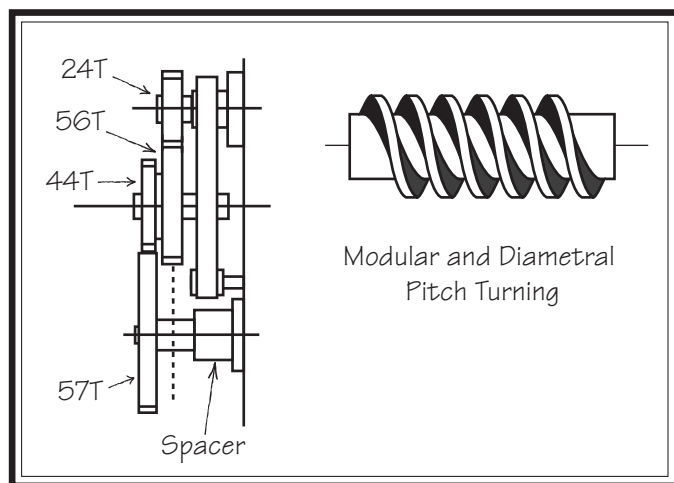
Use the standard end gear configuration (see **Figure 83**) for inch threading, metric threading, and all general feed operations.



**Figure 83. End gears in the standard configuration.**

## Alternate Configuration

Use the alternate end gear configuration when cutting modular or diametral threads, as illustrated in **Figure 84**.



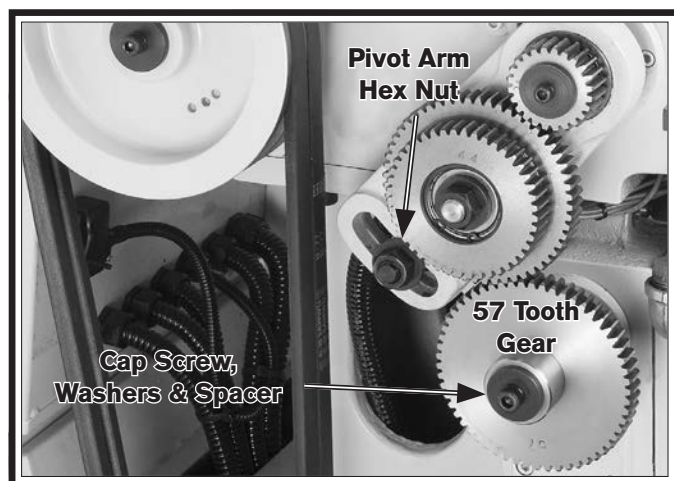
**Figure 84. Alternate end gear configuration.**

### Configuring End Gears

| Tools Needed         | Qty |
|----------------------|-----|
| Hex Wrench 6mm ..... | 1   |
| Wrench 22mm .....    | 1   |

#### To configure the end gears:

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover from the left side of the headstock.
3. Remove the cap screw, lock washer, and flat washer from the 57 tooth end gear (see **Figure 85**).



**Figure 85. End gear components.**

4. Loosen the pivot arm hex nut shown in **Figure 85**, then swing the pivot arm to the left so that 44T/56T gears are away from the 57T gear. Hand tighten the hex nut to keep the arm in place.

## NOTICE

**As you remove and replace end gears, use a stiff brush and mineral spirits to clean away the debris and grime from them, then re-lubricate them as instructed in End Gears on Page 71.**

5. Making sure to keep the shaft key firmly seated, remove the spacer and the 57T gear, then re-install them as follows:
    - For the standard end gear configuration, slide the 57T gear on first, then the spacer on the outside.
    - For the alternate end gear configuration, slide the spacer on first, then the gear.
  6. Re-install the cap screw, lock washer, and flat washer you removed in **Step 3** to secure the spacer and 57T gear. Do not overtighten.
  7. Slide the pivot arm back so that either the 44T or the 56T meshes with the 57T gear, then retighten the pivot arm hex nut.
- Note:** Make sure to keep approximately 0.002" play between the gears.
8. Replace and secure the end gear cover before re-connecting the lathe to power.

# Threading Controls

The following subsections describe how to use the threading controls and charts on this lathe. If you are unfamiliar with the process of cutting threads on a lathe, we strongly recommend that you read books, review industry trade magazines, or get formal training before doing any threading projects.

## Setting Threading Controls

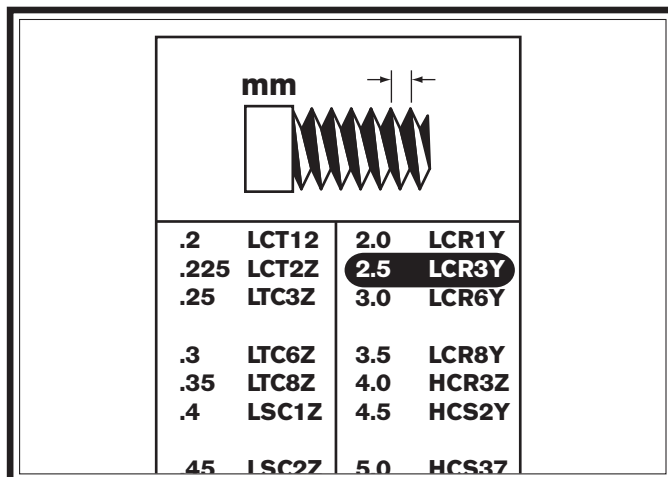
The threading charts on the headstock face display the settings for metric, inch, modular, and diametral threading.

For inch or metric threads, use the standard end gear configuration. For modular or diametral threads, use the alternate configuration

Use the controls on the lathe and follow along with the example below to better understand how to set up the lathe for the desired threading operation.

### Example: Metric Thread Width of 2.5mm

1. Make sure the end gears are in the standard configuration, which is used for all metric threading (refer to **End Gears** on **Page 56** for detailed instructions).
2. Locate the line in the metric thread chart that lists the setting for 2.5mm threads, as illustrated in **Figure 86**.



| mm   |       |            |              |
|------|-------|------------|--------------|
| .2   | LCT12 | 2.0        | LCR1Y        |
| .225 | LCT2Z | <b>2.5</b> | <b>LCR3Y</b> |
| .25  | LTC3Z | 3.0        | LCR6Y        |
| .3   | LTC6Z | 3.5        | LCR8Y        |
| .35  | LTC8Z | 4.0        | HCR3Z        |
| .4   | LSC1Z | 4.5        | HCS2Y        |
| .45  | LSC2Z | 5.0        | HCS3Z        |

Figure 86. Metric thread chart with a width of 2.5 mm highlighted.

3. The configuration string of characters to the right of the selected thread pitch (LCR3Y) displays the positions to set the threading controls for a metric thread width of 2.5mm.

**Note:** In the next step, use the chuck key to rock the spindle back-and-forth to help mesh the gears as you make adjustments.

4. Position the controls as directed by the configuration string (LCR3Y) as follows:
  - a) Move the feed range lever to the low (L) position.
  - b) Point the left gearbox lever to the "C".
  - c) Point the middle gearbox lever to the "R".
  - d) Position the bottom gearbox lever in the "3" slot.
  - e) Point the right gearbox lever to "Y".

The lathe is now set up to cut a metric thread width of 2.5mm.

## Apron Controls

The half nut lever engages the apron with the leadscrew which moves the carriage and cutting tool along the length of the workpiece for threading operations (see **Figure 87**).

**Important:** Make sure the feed control lever is in the disengaged (middle) position before attempting to engage the half nut.

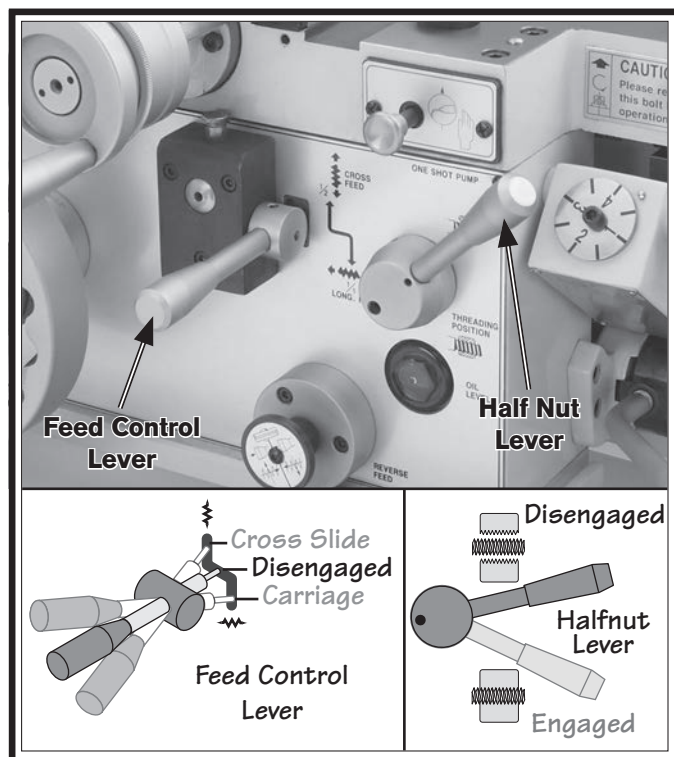


Figure 87. Apron threading controls.

## **NOTICE**

Attempting to engage the half nut while the cross slide or carriage is engaged with the feed rod could cause severe damage to the lathe. Never attempt to engage the half nut while the feed control lever is engaged.

## Thread Dial

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. The thread dial gear must be engaged with the leadscrew for this to work. Loosen the knurled knob on the thread dial, pivot the dial gear toward the leadscrew so that it properly meshes with the leadscrew threads, then re-tighten the knob, as shown **Figure 88**.

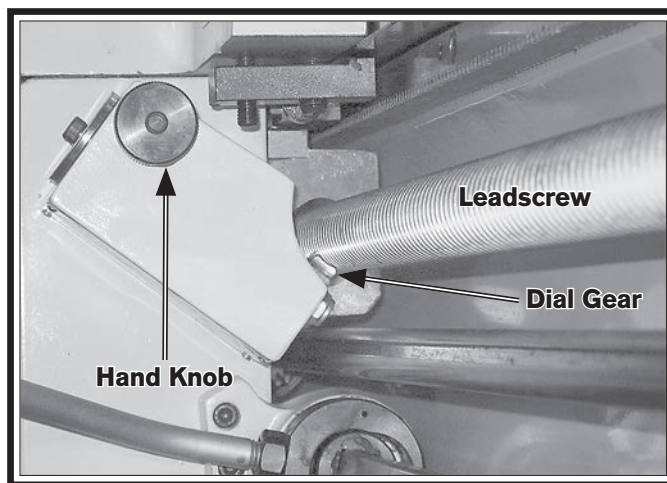


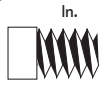

Figure 88. Thread dial engaged with the leadscrew.

## **NOTICE**

When threading, we recommend using the slowest speed possible and avoiding deep cuts, so you are able to disengage the half nut and prevent an apron crash!

### Thread Dial Chart

Find the TPI (threads per inch) that you want to cut in the left column of the thread dial chart (see **Figure 89**), then reference the dial number to the right of it. The dial numbers indicate when to engage the half nut for a specific thread pitch. The thread dial chart can also be found on the front of the thread dial housing.

|  |   |
|--|---|
| In.<br> |  |
| 4,8,12,16,20,24,<br>28,32,36,40,44,<br>48,56,60,72                                       | Any Position  |
| 2,6,10,14,<br>18,22,26,<br>30,54   | Non-Numbered Position   |
| 3,5,7,9,<br>11,13,15,<br>19,23,27  | Numbered Position<br>1,2,3,4  |
| 2½,3½,4½,<br>7½,11½,13½  | Position<br>1,3 or 2,4  |
| 2¼,2¾,<br>3¼,3¾  | Position<br>1 Only  |
| 2⅞   | Same as Metric Threads  |


**Figure 89.** Thread dial chart.

**Note:** The thread dial is not used for metric threads, or diametral and modular gear turning. You must leave the half nut engaged from the beginning until the threads/gears are complete for these types of operations.

The following examples explain how to use the thread dial chart.

#### TPI Divisible By 4


For threading a TPI divisible by four, use any line on the thread dial (see **Figure 90**).

|  |              |   |
|--|--------------|---|
| <b>TPI</b>   |              |  |
| 4,8,12,16,20,24,<br>28,32,36,40,44,<br>48,56,60,72 | Any Position |   |

**Figure 90.** Any position on the dial for threading TPI divisible by 4.

#### Even TPI Not Divisible By 4


For threading a TPI that is even but not divisible by 4, use any of the non-numbered lines on the thread dial (see **Figure 91**).

|                                  |                       |   |
|----------------------------------|-----------------------|---|
| <b>TPI</b>                       |                       |  |
| 2,6,10,14,<br>18,22,26,<br>30,54 | Non-Numbered Position |   |

**Figure 91.** Marks are selected on the dial for threading even TPI not divisible by 4.

#### Odd Numbered TPI


For odd numbered TPI, use any of the numbered lines on the thread dial (see **Figure 92**).

|                                   |                              |  |
|-----------------------------------|------------------------------|--|
| <b>TPI</b>                        |                              |  |
| 3,5,7,9,<br>11,13,15,<br>19,23,27 | Numbered Position<br>1,2,3,4 |  |

**Figure 92.** Numbers are selected on the dial for threading odd numbered TPI.

#### ½ Fractional TPI

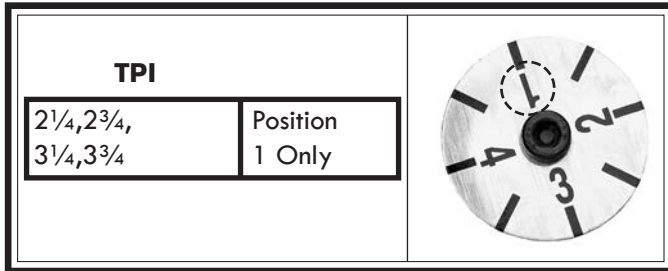
Use any opposing number pairs—2/4 or 1/3 on the thread dial for ½ fractional TPI (see **Figure 93**). For example, to cut a 3½ thread, select 1 or 3 on the dial.

|                         |                        |   |
|-------------------------|------------------------|---|
| <b>TPI</b>              |                        |  |
| 2½,3½,4½,<br>7½,11½,13½ | Position<br>1,3 or 2,4 |   |

**Figure 93.** Opposing number group are selected on dial for cutting ½ thread TPI.

**1/4 or 3/4 Fractional TPI**

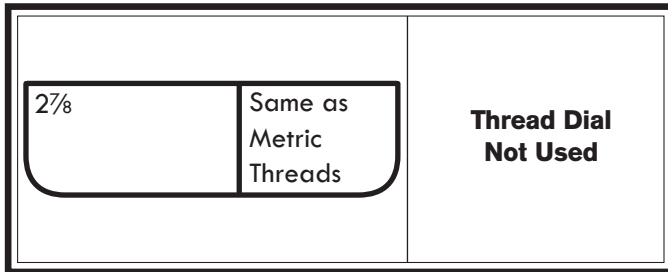
For TPI that have a 1/4 or 3/4 fraction, use position 1 on the thread dial (see **Figure 94**).



**Figure 94. Position for 1/4 or 3/4 fractional TPI.**

**2 7/8 TPI**

The thread dial is not used for 2 7/8 threading or metric threading (see **Figure 95**). The half nut must stay engaged with the leadscrew throughout the entire threading operations.

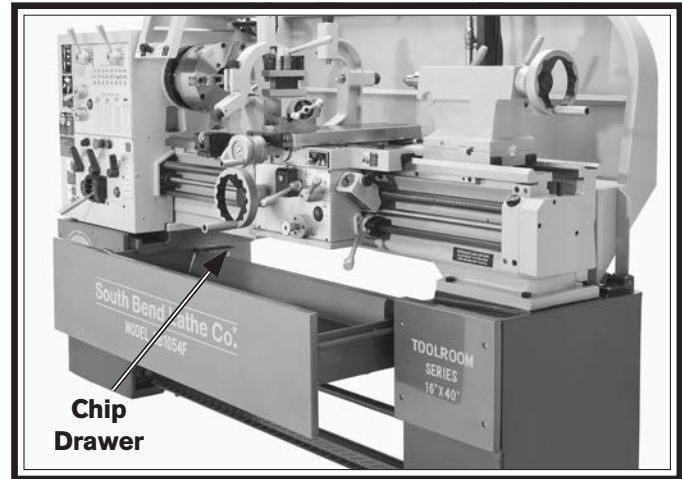


**Figure 95. Half nut stays engaged for 2 7/8 TPI.**

# Chip Drawer

The chip drawer shown in **Figure 96** catches swarf and metal chips during the machining process. It easily slides open to provide access to swarf during cleanup.

Also, the chip drawer contains a screen that allows run-off coolant to drain back into the reservoir.



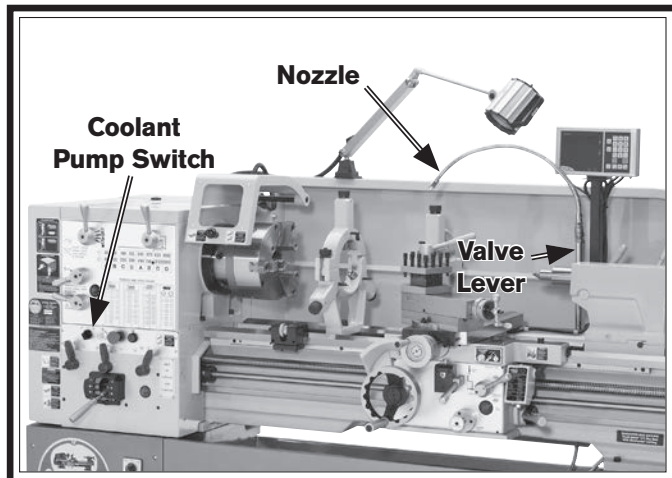
**Figure 96. Chip drawer.**

## ⚠ CAUTION

If pulled out quickly and more than halfway, the drawer could fall out and hit your legs and feet, causing serious injury. Therefore, open the drawer slowly and avoid opening it more than halfway.

## Coolant System


When the coolant pump switch is turned **ON**, the fluid is delivered through the nozzle attached to the carriage. The flow is controlled by the valve lever at the base of the nozzle (see **Figure 97**).



**Figure 97. Coolant system controls and components.**

Always use high quality coolant and follow the manufacturer's instructions for diluting. The quick reference table shown in **Figure 98** can help you select the appropriate fluid.




Refer to **Coolant System Service** on **Page 72** for detailed instructions on how to add or change fluid. Check the coolant regularly and promptly change it when it becomes overly dirty or rancid, or as recommended by the fluid manufacturer.



### ! WARNING

**BIOLOGICAL & POISON HAZARD!**

**Use the correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.**

## NOTICE

**Running the pump without adequate fluid in the coolant tank may permanently damage it, which will not be covered under warranty.**

### To use the coolant system on your lathe:

1. Make sure the coolant tank is properly serviced and filled with the appropriate fluid, and that you are wearing the necessary personal protection equipment.
2. Position the coolant nozzle for your operation.
3. Use the coolant pump switch on the control panel to turn the pump **ON**.
4. Adjust the flow of coolant by using the valve lever near the base of the nozzle hose.

**Important:** Promptly clean any splashed fluid from the floor to avoid a slipping hazard.

| Workpiece        | Dry | Water Soluble Oil | Synthetic Coolants | Sulferized Oil | Mineral Oil |
|------------------|-----|-------------------|--------------------|----------------|-------------|
| Aluminum         |     | X                 | X                  |                |             |
| Brass            | X   | X                 | X                  |                |             |
| Bronze           | X   | X                 | X                  |                | X           |
| Cast iron        | X   |                   |                    |                |             |
| Low Carbon Steel |     | X                 | X                  |                |             |
| Alloy Metals     |     | X                 | X                  | X              | X           |
| Stainless Steel  |     | X                 | X                  | X              | X           |

**General Note:** Coolants are used for heavy-duty lathe operations and production turning. Oil-water emulsions and synthetic cutting fluids are the most common for typical lathe operations. Sulferized oils often are used for threading. For small projects, spot lubrications can be done with an oil can or brush, or omitted completely.

**Figure 98. Coolant selection table.**



## Accessories

This section includes the most common accessories available for your lathe, which may be available through your local South Bend Lathe Co. dealer. If you do not have a dealer in your area, please call us at (360) 734-1540 or email us at [cs@southbendlathe.com](mailto:cs@southbendlathe.com).

### SB1434—8¼" Backplate D1-6

### SB1279—10 Pc. Precision 5-C Collet Set

Set of 10 collets sized from ⅛" - ¾". Same quality as the individual collets, only packaged in one convenient set.



Figure 99. Model SB1279 10 Pc. 5-C Collet Set.

### SB1268—Collect Attachment

This collet attachment takes advantage of the South Bend factory-made collet port in the lathe gear cover. This accessory installs easily on these South Bend Lathes without having to modify the gear cover. The Model SB1268 is capable of delivering years of trouble-free service. It is manufactured with the same high-quality workmanship, materials, and tolerances South Bend machinery is known for.

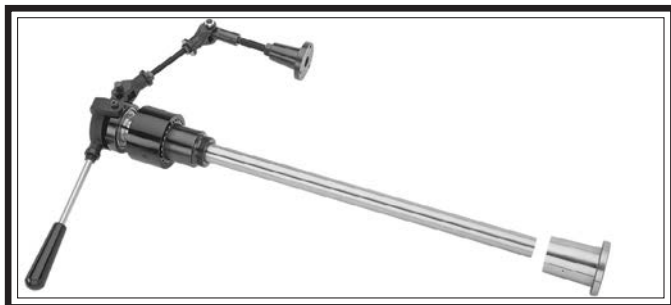


Figure 100. Model SB1268 Collect Attachment

### SB1239—MT#4 High Performance Live Center

South Bend® brand live centers are the best centers in the industry made with pride and uncompromising quality.

- Shafts are made of alloy steel and vacuum heat treated to HRC60 ± 1 for high rigidity and durability.
- Centers use a combination of roller bearings, thrust ball bearings and ball bearings.
- Applicable for CNC lathes and high speed turning.
- Waterproof design.
- 60° centers.

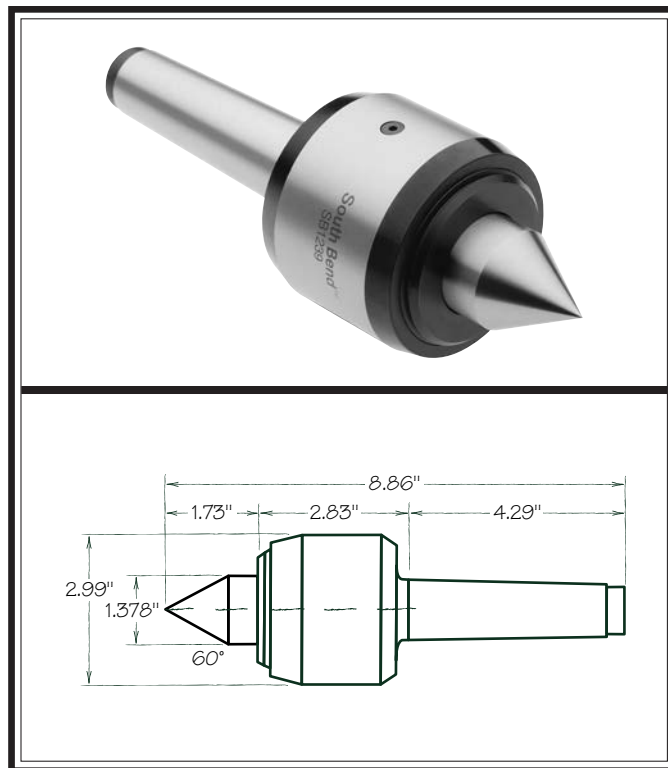


Figure 101. Model SB1239 High Performance Live Center.

### SB1243—MT#4 Long-Nose High-Performance Live Center

**SB1247—MT#4 Bull Nose Center**

- Cr-Mo steel; hardened to HRC60 ± 1
- Taper roller & ball bearing construction
- Great for turning pipes

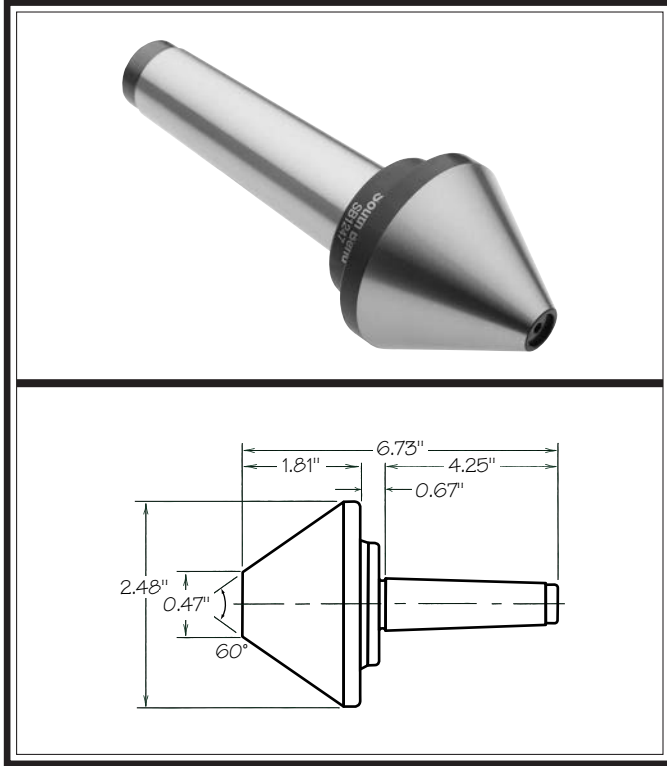


Figure 102. SB1247 MT4 Bull Nose Center.

**SB1269—Taper Attachment**

This taper attachment mounts quickly to the back bed way of your lathe. Accurate tapers of up to 12" can be produced without repositioning the attachment, having to offset the tailstock, or disengaging the cross slide nut. The Model SB1269 features scales at both ends, reading inches-per-foot and degrees. An angle adjusting knob with fine threads achieves exacting control when setting tapers.

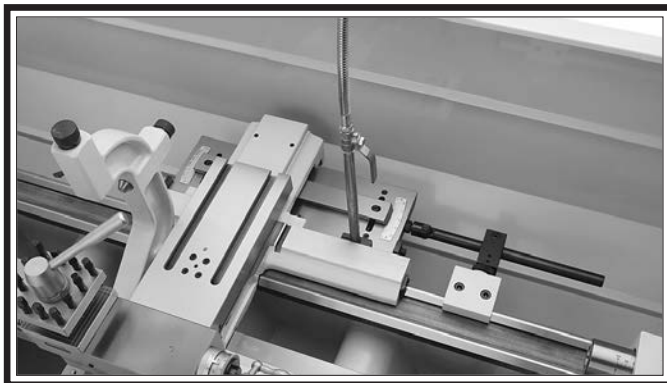


Figure 103. Model SB1269 Taper Attachment

**SB1298—SBL Bench Lathe Shop Clock****SB1299—SBL Toolroom Lathe Shop Clock****SB1300—SBL Lathe with Man**

These fine traditional shop clocks are constructed with a metal antique-finished frame. They are easy to read from a distance and measure 14" in diameter. Pictures just don't do them justice. They are very nice quality clocks and perfect for the South Bend Lathe aficionado.

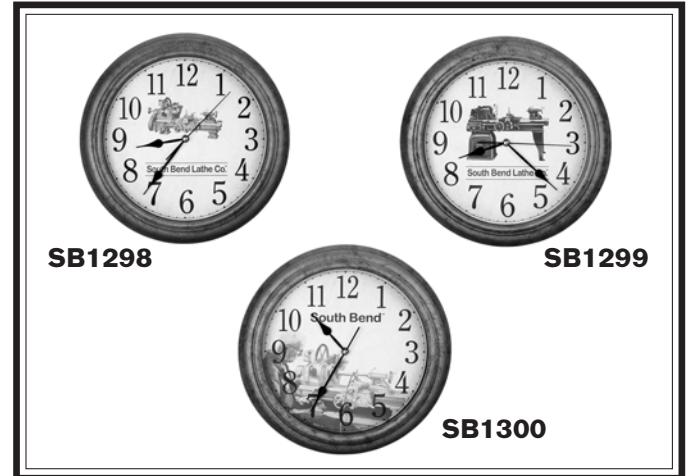


Figure 104. Antique-finished South Bend shop clocks.

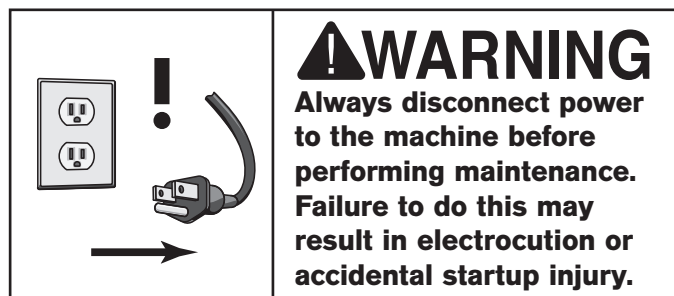
**SB1251—Heavy-Duty Oak Tool Chest**

Proudly made in the South Bend tradition, this heavy-duty oak tool chest will safeguard your finest tools for many years of dependable service. Solidly constructed with mortis and tenon joinery, this tool chest features a locking top lid and front panel, and 13 drawers of various sizes. Seven drawers even have removable dividers for organizing and protecting tools and tooling. All drawers and the top compartment are felt-lined for added protection. The front panel secures all drawers when the top lid is latched or locked and neatly slides under the bottom drawer when accessing the drawers. All hardware is brass including the heavy-duty side handles.



Figure 105. Model SB1251 Oak Tool Chest

# Maintenance Schedule



Each operator of this machine is responsible for ensuring proper care of the equipment. We strongly recommend all operators make a habit of following the daily maintenance procedures.

For optimum performance from this machine, this maintenance schedule must be strictly followed. Use the chart provided on **Page 66** to ensure this is done.

## Ongoing

To maintain a low risk of injury and proper machine operation, if you ever observe any of the items below, shut down the machine immediately and fix the problem before continuing operations:

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Guards removed.
- STOP button not working correctly or not requiring you to reset it before starting the machine again.
- A reduction in braking speed or efficiency.
- Oil level not visible in the sight glasses.
- Coolant not flowing out.
- Any other unsafe condition.

## Daily, Before Operations

- Check/add headstock oil (**Page 67**).
- Check/add gearbox oil (**Page 68**).
- Check/add apron oil (**Page 68**).
- Check/add coolant (**Page 72**).
- Lubricate the ways (**Page 69**).
- Add oil to the ball oilers and oil cup (**Page 70**).
- Clean/lubricate the leadscrew (**Page 70**).
- Disengage the feed control lever on the apron (to prevent crashes upon startup).
- Ensure carriage lock bolt is loose.

## Daily, After Operations

- Depress STOP button and shut **OFF** the master power switch (to prevent accidental startup).
- Vacuum/clean all chips and swarf from bed, slides, and chip drawer.
- Wipe down all unpainted or machined surfaces with an oiled rag.

## Monthly

- Drain and clean the coolant tank, then add new fluid (**Page 72**).

## Semi-Annually

- Change the headstock oil (**Page 67**).
- Lubricate end gears (**Page 71**).

## Annually

- Change the apron oil (**Page 68**).
- Change the gearbox oil (**Page 68**).

# Cleaning & Protecting

Regular cleaning is one of the most important steps in taking care of this lathe. We recommend that the cleaning routine be planned into the workflow schedule, so that adequate time is set aside to do the job right.

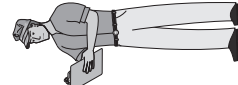
Typically, the easiest way to clean swarf from the bed ways and chip drawer is to use a wet/dry shop vacuum that is dedicated for this purpose only. The small chips left over after vacuuming can be wiped up with a slightly oiled rag. Avoid using compressed air to blow off chips, as it may drive them deeper into moving surfaces and could cause sharp chips to fly into your face or hands.

Besides the ways, all other unpainted and machined surfaces should be wiped down daily to keep them rust-free and in top condition. This includes any surface that is vulnerable to rust if left unprotected (especially any parts that are exposed to water-soluble coolant). Typically, a thin film of oil is all that is necessary for protection.

**South Bend Lathe Co.® Monthly Maintenance Chart Gearhead Lathe**

| Item   | Day 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |  |  |  |  |  |  |
|--|-------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|--|--|--|--|
| <b>Lubrication</b>   |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Ways   |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Ball Oilers  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Leadscrew  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Unpainted Surfaces   |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| <b>Inspection</b>  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Headstock Oil Level  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Gearbox Oil Level  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Apron Oil Level  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Coolant Level  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| Coolant Condition  |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |
| <b>Refer to the coolant manufacturer's instructions for more information regarding coolant condition, replacement, disposal, and safety.</b> |       |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |  |  |  |  |

Use this chart to keep track of the maintenance performed on your South Bend Lathe. Cross out or initial the "Day" box for each item on the list. If the box is blacked out, maintenance is not required for that item on that day. Use the maintenance poster included with your South Bend Lathe as a quick reference guide when performing the maintenance items.



**Annual Service**

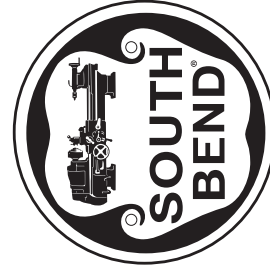
Once every year, or more often with heavy use, perform these service items. Keep track of when you last performed your annual service and when you'll need to perform it again.

Date of last annual service:

Date of next annual service:

| Service Item         | <input checked="" type="checkbox"/> |
|----------------------|-------------------------------------|
| Change Gearbox Oil   |                                     |
| Change Headstock Oil |                                     |
| Change Apron Oil     |                                     |
| Change Coolant       |                                     |

Make copies of this page to use each month. Keep each chart as a maintenance record for your South Bend Lathe.



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# Lubrication

## NOTICE

The following recommended lubrication schedules are based on light-to-medium usage. For heavy use, these lubrication tasks may need to be performed more frequently than recommended here.

Failure to follow reasonable lubrication practices as instructed in this manual could lead to premature failure of lathe components and will void the warranty.

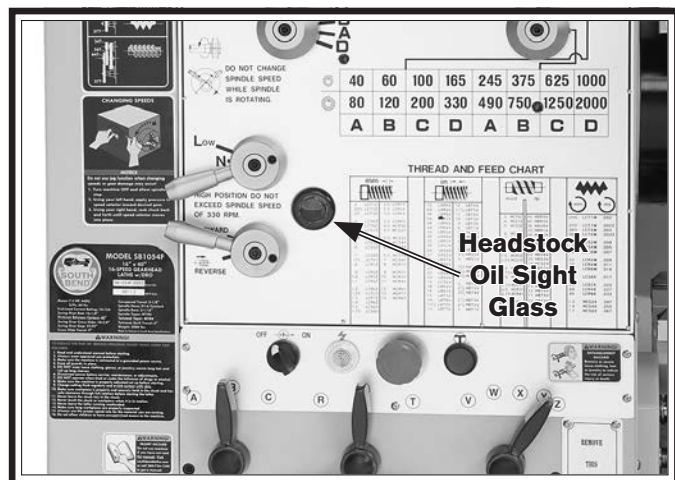
## Headstock

Oil Type .. Mobil DTE Light or ISO 32 Equivalent  
 Oil Amount ..... 8 Quarts  
 Check/Add Frequency ..... Daily  
 Change Frequency ..... Every 6 Months

The headstock gearing is lubricated by an oil bath that distributes the lubricant with the motion of the gears, much like an automotive manual transmission.

## Checking Oil Level

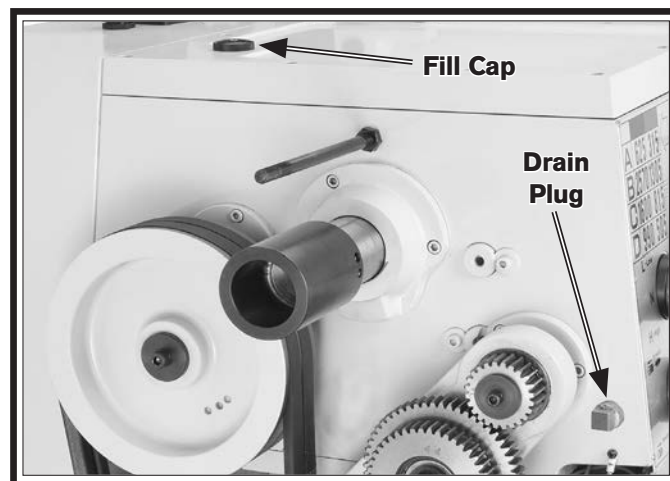
The headstock has the proper amount of oil when the sight glass shown in **Figure 106** is halfway full.



**Figure 106. Location of headstock oil sight glass.**

## Adding Oil

The oil fill cap is located on top of the headstock, as shown in **Figure 107**.



**Figure 107. Headstock fill and drain plugs.**

## Changing Oil

| Items Needed              | Qty |
|---------------------------|-----|
| Wrench 5/8"               | 1   |
| Catch Pan (8 Qt. Minimum) | 1   |

### To change the headstock oil:

1. DISCONNECT LATHE FROM POWER!
  2. Remove the end gear cover.
  3. Remove the fill cap on top of the headstock to allow the oil to drain more freely.
  4. Place the catch pan under the headstock drain plug (see **Figure 107**), then remove the plug and allow all of the oil to drain out.
  5. Replace the drain plug and clean up any oil that spilled.
- Tip:** To make this task easier in the future, replace the drain plug with a small pipe extension and cap. Make sure that this assembly does not interfere with properly securing the end gear cover.
6. Add oil to the headstock reservoir until the sight glass is halfway full.
  7. Replace the end gear cover before re-connecting the power.

### Quick-Change Gearbox

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent  
 Oil Amount ..... 1.4 Quarts  
 Check/Add Frequency ..... Daily  
 Change Frequency ..... Annually

#### Checking Oil Level

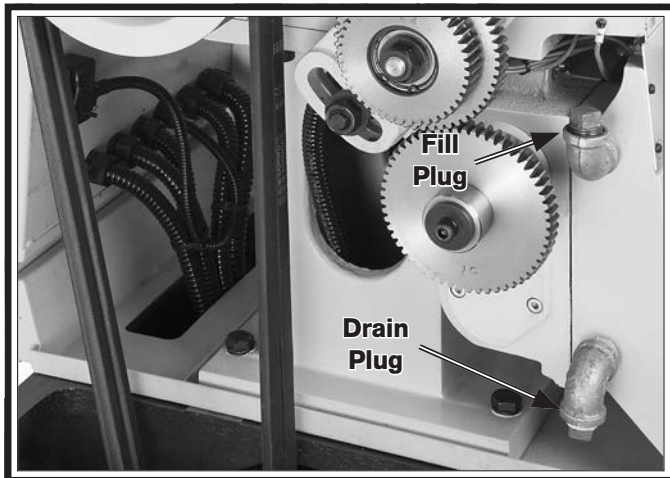
The quick-change gearbox has the proper amount of oil when the sight glass shown in **Figure 108** is halfway full.



**Figure 108.** Location of quick-change gearbox oil sight glass.

#### Adding Oil

Remove the quick-change gearbox fill plug (see **Figure 109**), then add the oil until the level is approximately halfway in the gearbox oil sight glass.



**Figure 109.** Locations of the quick-change gearbox fill and drain plugs.

### Draining Oil

Place a catch pan under the quick-change gearbox drain plug (see **Figure 109**), loosen the fill plug and remove the drain plug, then allow the gearbox reservoir to empty.

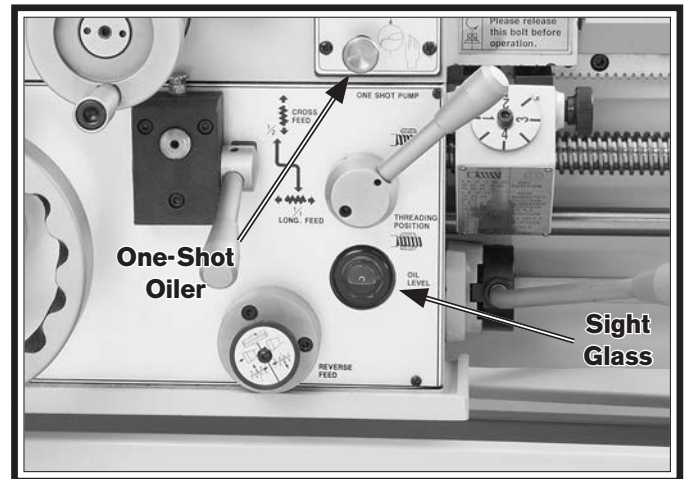
### Apron

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent  
 Oil Amount ..... 1.2 Quarts  
 Check/Add Frequency ..... Daily  
 Change Frequency ..... Annually

#### Checking Oil Level

The apron has the proper amount of oil when the sight glass shown in **Figure 110** is halfway full.

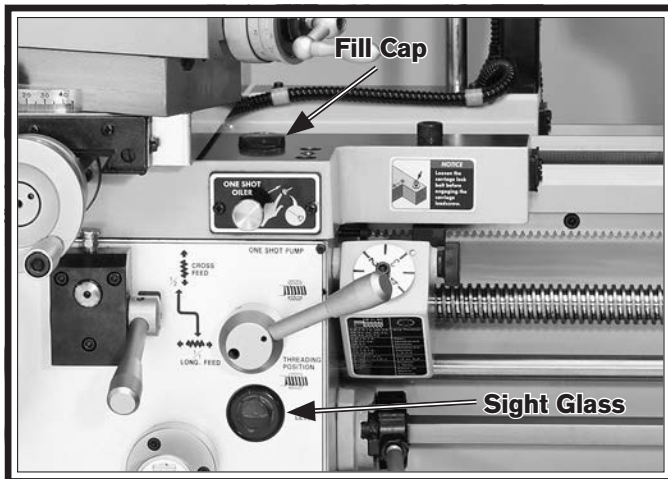
**Important:** Keep in mind that the apron one-shot oiler uses the oil from the apron reservoir. Check the oil level before using the one-shot oiler.



**Figure 110.** Location of apron oil sight glass.

## Adding Oil

Remove the twist-off fill cap shown in **Figure 111**, and add oil until the sight glass is halfway full.

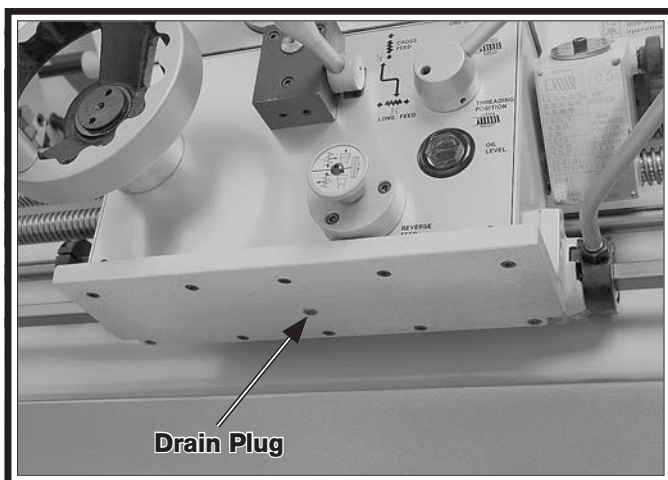


**Figure 111.** Location of apron fill cap.

## Draining Oil

Since the apron oil reservoir supplies the one-shot oiler, the oil is constantly being refreshed as you refill the reservoir. However, drain and flush the apron oil reservoir at least once a year to keep it clean.

Place a catch pan under the apron drain plug shown in **Figure 112**, loosen the fill plug, then use a 6mm hex wrench to remove the drain plug and empty the reservoir.



**Figure 112.** Location of apron drain plug.

## One-Shot Oiler

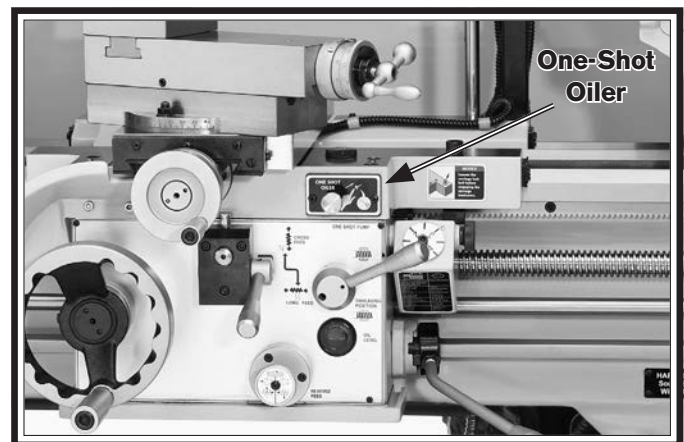
The one-shot oiler shown in **Figure 113** lubricates the saddle ways with oil from the apron reservoir.

To use the one-shot oiler to lubricate the ways, pull the pump knob out for two or three seconds and then push it in. The pump draws oil from the apron reservoir and then forces it through drilled passages to the way guides.

Repeat this process and move the carriage and cross slide through their full path of movement to distribute oil along the way guides.

Lubricate the guides once before and once after operating the lathe. If the lathe is in a moist or dirty environment, increase the lubrication interval.

Check the apron oil level through the sight glass before using the one-shot oiler.



**Figure 113.** Location of one-shot oiler on the apron.

## Leadscrew

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent  
 Oil Amount ..... As Needed  
 Lubrication Frequency ..... Daily

Before lubricating the leadscrew, clean it first with mineral spirits. A stiff brush works well to help clean out the threads. Make sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

Apply a thin coat of oil along the length of the leadscrew. Use a stiff brush to make sure the oil is applied evenly and down into the threads.

**Note:** In some environments, abrasive material can become caught in the leadscrew lubricant and drawn into the half nut. In this case, lubricate the leadscrew with a quality dry lubricant.

## Ball Oilers & Oil Cup

Oil Type ..... Mobil Vactra 2 or ISO 68 Equivalent  
 Oil Amount ..... As required  
 Pump Oil Can w/Plastic or Rubber Cone Tip ..... 1  
 Lubrication Frequency ..... Before and After Use

Proper lubrication of ball oilers is done with a pump-type oil gun that has a plastic or rubberized cone tip. We do not recommend using a metal needle or lance tips that can push the ball too far into the oiler, break the spring seat, and cause the ball to fall into the oil galley.

Lubricate the ball oilers before and after machine use, and more frequently under heavy use. When lubricating ball oilers, first clean the outside surface to remove any dust or grime. Push the rubber or plastic tip of the oil can nozzle against the ball oiler to create a hydraulic seal, then pump the oil can once or twice. If you see sludge and contaminants coming out of the lubrication area, keep pumping the oil gun until the oil runs clear. When finished, wipe away any excess oil.

Add oil to the feed control lever gearing oil cup until the cup is full. The oil will slowly drain onto the gearing.

Refer to **Figures 114–116** to identify the locations of each oil device.

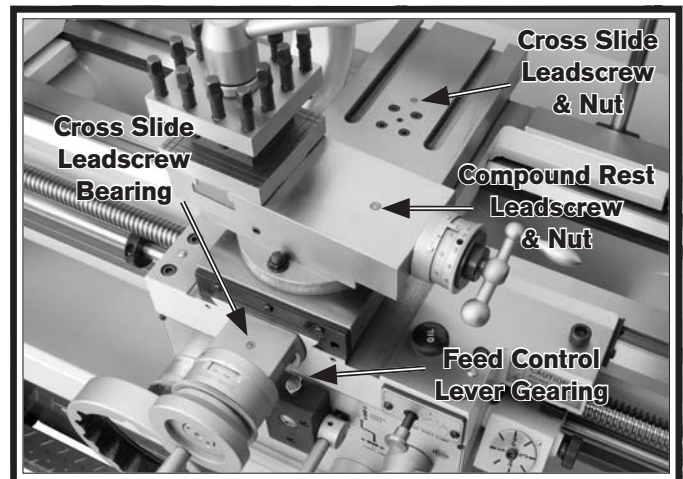


Figure 114. Carriage ball oilers and oil cup.

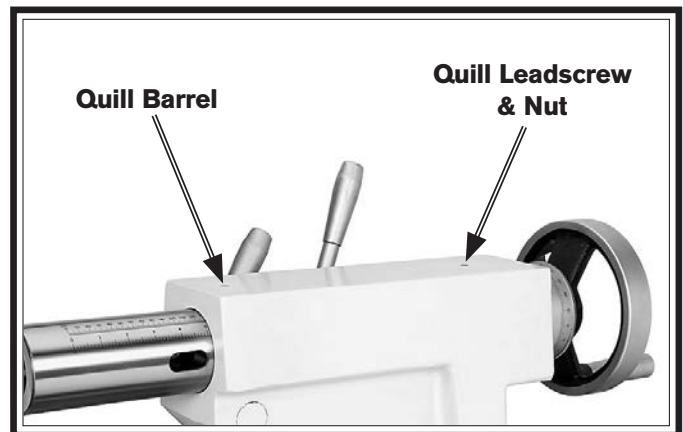


Figure 115. Tailstock ball oilers.

## Leadscrew End Bearing

To check the oil level, remove the fill cap and look inside the reservoir (**Figure 116**). The oil level must remain full to keep the leadscrew bearing adequately lubricated. Pour oil in the reservoir until it is as full as possible without overflowing.

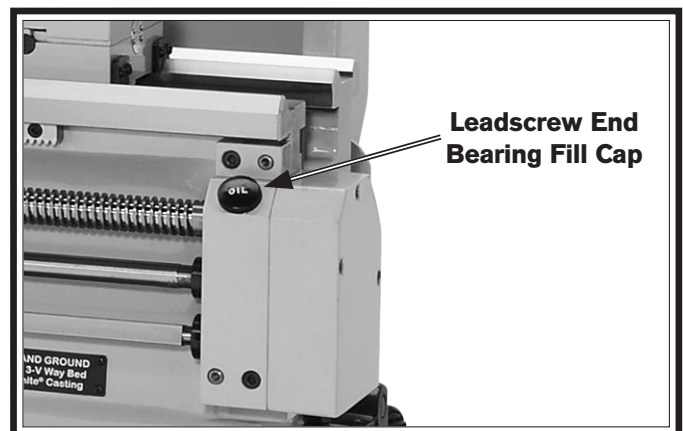


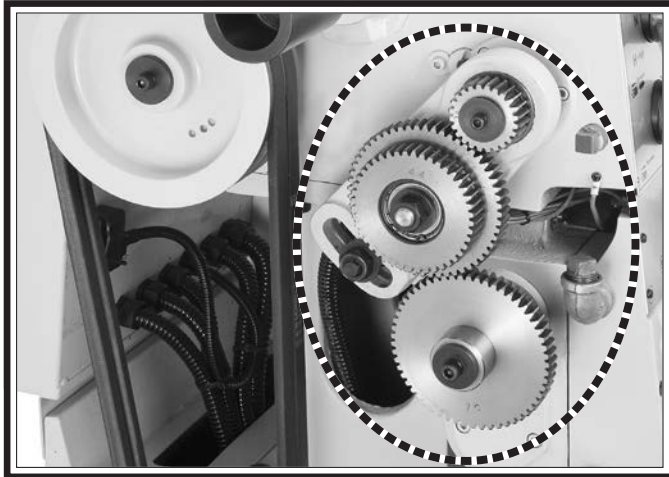
Figure 116. Leadscrew end bearing fill cap.



## End Gears

Grease Type..... NLGI#2  
Frequency ..... Annually or When Changing

The end gears, shown in **Figure 117**, should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. Wipe away excess grease that could be thrown onto the V-belts and reduce optimal power transmission from the motor.



**Figure 117. End gears.**

### Handling & Care

Make sure to clean and lubricate any gears you install or change. Unless you are very careful during handling and storage, the coating of grease on the gears will easily pickup dirt or debris, which can then spread to the other gears and increase the rate of wear.

Make sure the end gear cover remains installed whenever possible to keep the gears free of dust or debris from the outside environment.

### Lubricating

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover and all the end gears shown in **Figure 117**.
3. Clean the end gears thoroughly with mineral spirits to remove the old grease. Use a small brush if necessary to clean between the teeth.
4. Clean the shafts, and wipe away any grease splatters in the vicinity and on the inside of the headstock cover.
5. With a clean brush, apply a thin layer of grease on the gears. Make sure to get grease between the gear teeth, but do not fill the teeth valleys.
6. Install the end gears and mesh them together with an approximate 0.002" backlash. Once the gears are meshed together, apply a small dab of grease between them where they mesh together—this grease will be distributed when the gears rotate and re-coat any areas scraped off during installation.

# Coolant System Service

The coolant system consists of a fluid tank, pump, and flexible nozzle. The pump pulls fluid from the tank and sends it to the valve, which controls the flow of coolant to the nozzle. As the fluid leaves the work area, it drains back into the tank through the chip drawer and catch tray where the swarf is screened out.

Use **Figure 118** to identify the locations of the coolant system controls and components.

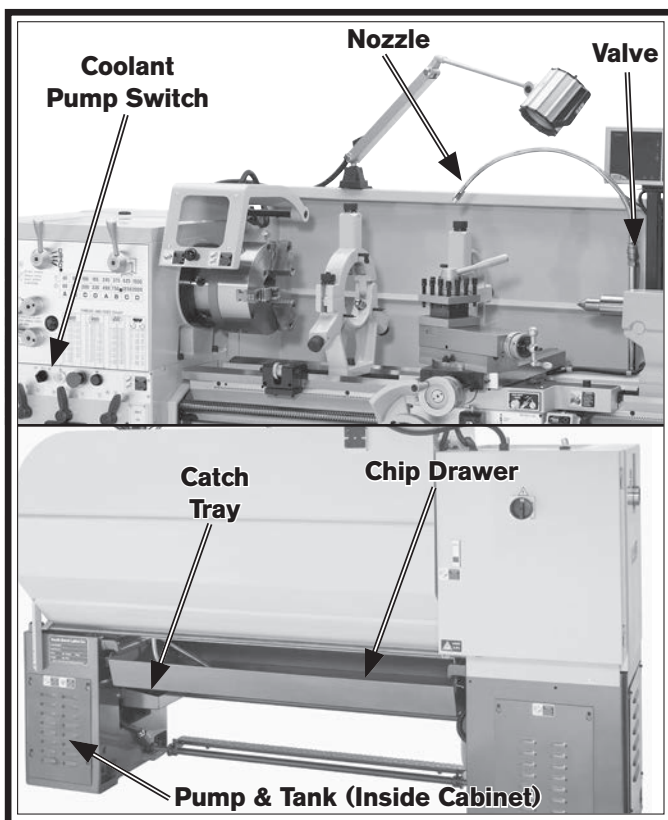


Figure 118. Coolant system controls and components.

Although most swarf from machining operations is screened out of the coolant before it returns to the tank, small particles will accumulate in the bottom of the tank in the form of sludge. To prevent this sludge from being pulled into the pump and damaging it, the pump's suction tube is positioned a couple inches from the bottom of the tank and fitted with a fine screen. This works well when the tank is regularly cleaned; however, if too much sludge is allowed to accumulate before the tank is cleaned, the pump will inevitably begin sucking it up.

## Hazards

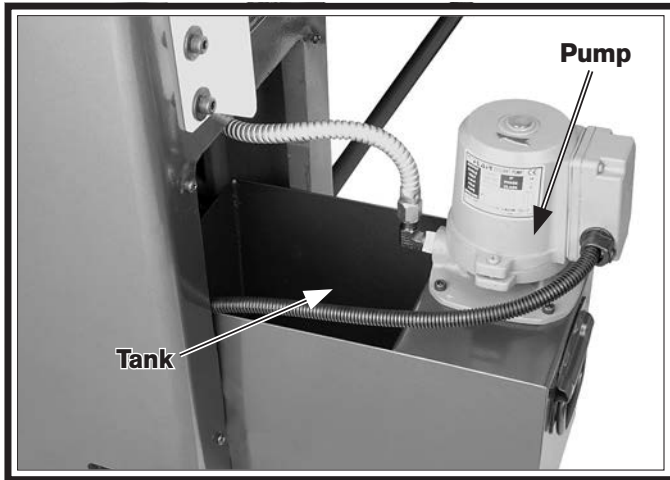
As coolants age, dangerous microbes can proliferate and create a biological hazard. The risk of exposure to this hazard can be greatly reduced by replacing the old fluid on a monthly basis, or as indicated by the fluid manufacturer.

The important thing to keep in mind when working with the coolant is to minimize exposure to your skin, eyes, and lungs by wearing the proper PPE (Personal Protective Equipment), such as splash-resistant safety glasses, long-sleeve waterproof gloves, protective clothing, and a NIOSH approved respirator.

|  |  |
|--|--|
|  | <p><b>!WARNING</b><br/><b>BIOLOGICAL &amp; POISON HAZARD!</b></p>  |
|  | <p><b>Use the correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.</b></p> |

## Adding Fluid

1. DISCONNECT LATHE FROM POWER!
2. Remove the vented cover and slide the tank out, as shown in **Figure 119**.



**Figure 119. Coolant tank and pump.**

3. Pour coolant into the tank until it is nearly full.
4. Slide the tank back into the cabinet and replace the vented cover.

## Changing Coolant

When you replace the old coolant, take the time to thoroughly clean out the chip drawer, catch tray, and fluid tank. The entire job only takes about a ½ hour when you are prepared with the proper materials and tools. Make sure to dispose of old fluid according to federal, state, and fluid manufacturer's requirements.

### Items Needed:

|  | <b>Qty</b>                                   |
|--|--|
| Safety Wear .....                          | See <b>Hazards</b> section on <b>Page 72</b> |
| New Coolant .....                          | 3 Gallons                                    |
| Empty 5-Gallon Bucket w/Lid .....          | 2  |
| Phillips Screwdriver #2 .....              | 1  |
| Wrench ¾" .....                            | 1  |
| Disposable Shop Rags .....                 | As Needed                                    |
| Hose or Tubing 5/8" x 60" (Optional) ..... | 1 Piece                                      |
| Magnets (Optional) .....                   | As Many As Desired                           |

### To change the coolant:

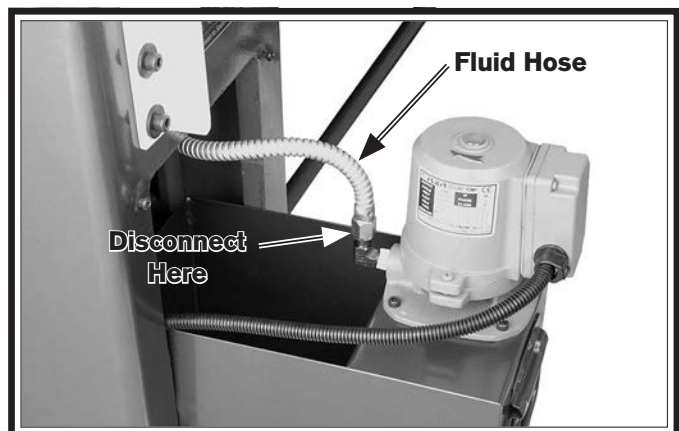
1. Position the coolant nozzle over the splash guard so that it is pointing behind the lathe. If you have the optional hose, connect it to the end of the nozzle now.
2. Place the 5-gallon bucket behind the lathe and under the coolant nozzle. If you have the optional hose, place the hose in the bucket. Otherwise, you may need to have another person hold the bucket up to the nozzle to prevent coolant from splashing out of the bucket.
3. Turn the coolant pump **ON** and pump the old fluid out of the reservoir. Turn the pump **OFF** immediately after the fluid stops flowing.

## **NOTICE**

**Running the coolant pump without adequate fluid in the tank may permanently damage it, which will not be covered under warranty.**

4. DISCONNECT LATHE FROM POWER!
5. Remove the vented cover and slide the tank out.
6. To enable the remaining fluid to be poured out in the next step, disconnect the fluid hose from the pump (see **Figure 120**).

**Note:** The electrical conduit was purposely left long, so the tank can be removed and dumped out without disconnecting wires from the pump.



**Figure 120. Fluid hose and connection.**

7. Pour the remaining coolant into a 5-gallon bucket and close the lid.
8. Clean all the sludge out of the bottom of the tank and then flush it clean. Use the second bucket to hold the waste and make sure to seal the lid closed when done.

Dispose of the old coolant and swarf according to federal, state, and fluid manufacturer's requirements.

9. Slide the tank partially into the base and re-connect the fluid hose (if removed).

**Tip:** Leave one or more magnets at the bottom of the tank to collect metal chips and make cleanup easier next time. This will also help keep small metal chips out of the pump.

10. Refill the tank with new coolant, then slide it completely into the base.
11. Replace the vented cover panel.
12. Connect the lathe to power and point the nozzle into the chip drawer.
13. Turn the coolant pump **ON** to verify that fluid cycles properly, then turn it **OFF**.

## Machine Storage

To prevent the development of rust and corrosion, the lathe must be properly prepared if it will be stored for a long period of time. Doing this will ensure the lathe remains in good condition for later use.

**To prepare the lathe for short-term storage (up to one year):**

1. Pump out the old coolant, and remove and blow out the lines with compressed air and a few drops of way oil.
2. DISCONNECT LATHE FROM POWER!
3. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil.
4. Lubricate the machine as outlined in the lubrication section. Be sure to use the oil gun to purge all ball oilers and oil passages with fresh oil.
5. Cover the lathe and place it in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make the chuck guard cloudy.
6. Once or twice a month, depending on the ambient humidity levels in the storage environment, wipe down the machine as outlined in **Step 3**. Slide the carriage, micrometer stop, tailstock, and steady rest down the lathe bed to make sure that way spotting is not beginning to occur.
7. Every few months, rotate all gear-driven components by hand a few times in several gear selections. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion—especially during the winter months.

### To prepare your machine for long-term storage (a year or more):

1. Run the lathe and bring all gearboxes to operating temperature, then drain and refill them with clean oil.
2. Pump out the old coolant, and remove and blow out lines with compressed air and a few drops of way oil.
3. DISCONNECT LATHE FROM POWER!
4. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil, heavy grease, or rust preventative. Take care to ensure these surfaces are completely covered but that the rust preventative or grease is kept off of painted surfaces.
5. Lubricate the machine as outlined in the lubrication section. Be sure to use the oil gun to purge all ball oilers and oil passages with fresh oil.
6. Loosen or remove machine belts so they do not become stretched during the storage period. (Be sure to place a maintenance note near the power button as a reminder that the belts have been loosened or removed.)
7. Place a few moisture absorbing desiccant packs inside of the electrical box.
8. Cover the lathe and place it in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make the chuck guard cloudy.
9. Every few months, by hand rotate all gear-driven components a few times in several gear selections. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion—especially during the winter months.

Slide the carriage, micrometer stop, tailstock, and steady rest down the lathe bed to make sure that way spotting is not beginning to occur.

## Backlash Adjustment

Backlash is the amount of free play felt while changing rotation directions with the handwheel. This can be adjusted on the compound rest and cross slide leadscrews. Before beginning any adjustment, make sure that all associated components have been cleaned and lubricated.

### NOTICE

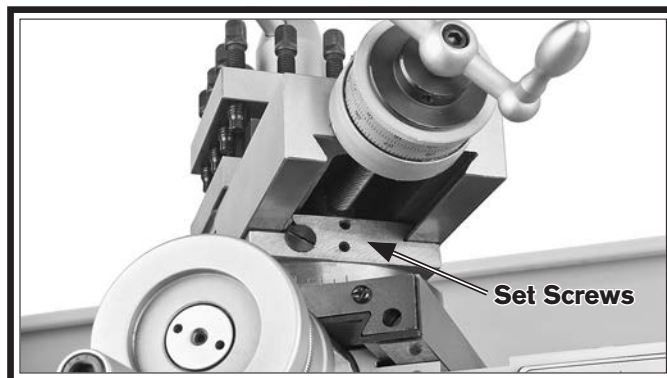
**Reducing backlash to less than 0.002" is impractical and can lead to accelerated wear of the wedge, nut, and leadscrew. Avoid the temptation to overtighten the backlash set screw while adjusting.**

### Compound Rest

#### Tools Needed:

|                      |            |
|----------------------|------------|
|                      | <b>Qty</b> |
| Hex Wrench 3mm ..... | 1          |

The compound rest backlash is adjusted by tightening the set screws shown in **Figure 121**. When these screws are adjusted against the leadscrew nut, they offset part of the nut to remove play between the nut and leadscrew.



**Figure 121. Compound rest backlash adjustment set screws.**

To adjust the backlash, rock the handwheel back-and-forth, and tighten the screws slowly until the backlash is approximately 0.002"–0.003", as indicated on the handwheel dial.

If you end up adjusting the nut too tight, loosen the set screws, tap the compound rest a few times with a rubber or wooden mallet, and turn the handwheel slowly back-and-forth until it moves freely, then try again.

## Cross Slide

### Tools Needed:

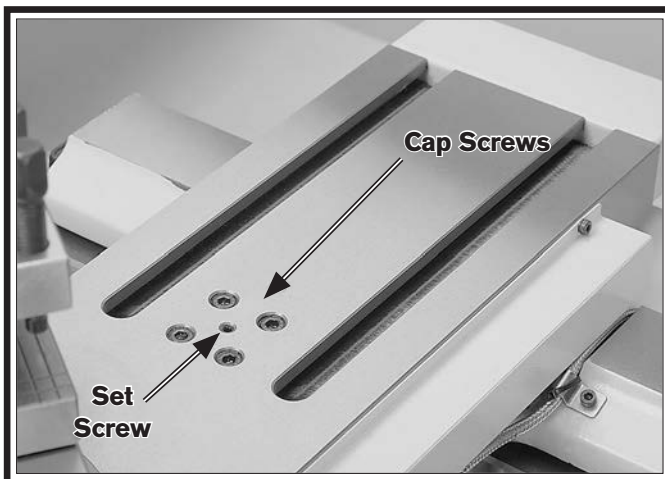
|                      | Qty |
|----------------------|-----|
| Hex Wrench 3mm ..... | 1   |
| Hex Wrench 5mm ..... | 1   |

The cross slide backlash is adjusted by loosening all four cap screws shown in **Figure 122**, then tightening the center set screw. This will push down on a wedge and force the leadscrew nut apart, taking up lash between the nut and leadscrew.

To adjust the backlash, remove the compound rest and loosen the four cap screws. Then, rock the cross slide handwheel back-and-forth and tighten the set screw slowly until the backlash is at approximately 0.002"–0.003" as indicated on the handwheel dial.

If you end up adjusting the nut too tight, loosen the set screw, tap the cross slide a few times with a rubber or wooden mallet, and turn the handwheel slowly back-and-forth, until the handle turns freely—then try again.

Remember to retighten the four cap screws when you are finished.



**Figure 122. Cross slide backlash adjustment screws.**

## Leadscrew End Play Adjustment

Over time, the leadscrew may develop a small amount of end play. This can be easily corrected by following this procedure.

### Tools Needed:

|                      | Qty |
|----------------------|-----|
| Hex Wrench 3mm ..... | 1   |
| Hex Wrench 5mm ..... | 1   |
| Wrench 24mm .....    | 1   |

### To remove leadscrew end play:

1. DISCONNECT LATHE FROM POWER!
2. Remove the end cover on the right side of the lathe to access the leadscrew end nut.
3. Loosen the two set screws in the leadscrew end nut (see **Figure 123**).



**Figure 123. Leadscrew end nut.**

4. Engage the half nut with the leadscrew.
5. Rotate the carriage handwheel back slightly and tighten the end nut at the same time until the end play is removed.
6. Retighten both set screws and replace the end cover.

## Gib Adjustment

The goal of adjusting the gib screws is to remove sloppiness or "play" from the ways without over-adjusting them to the point where they become stiff and difficult to move.

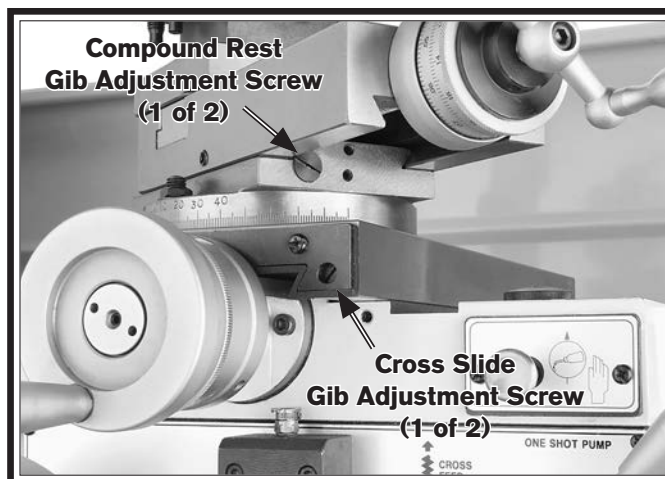
In general, loose gibs cause poor finishes and tool chatter; however, over-tightened gibs cause premature wear and make it difficult to turn the handwheels.

**Important:** Before adjusting the gibs, loosen the locks for the device so that the gibs can freely slide during adjustment, then lubricate the ways.

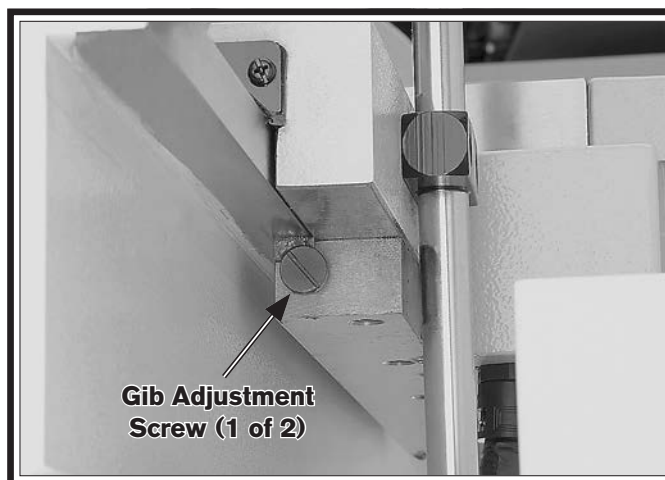
The gibs are tapered and held in position by a screw at each end. To adjust the gib, turn one screw  $\frac{1}{4}$  turn clockwise and the other screw  $\frac{1}{4}$  turn counterclockwise, so both screws move in the same direction and the same amount. Test the feel of the sliding component by turning the handwheel, and adjust the gib screws as necessary to make it tighter or looser.

The gib adjustment process usually requires some trial-and-error. Repeat the adjustment process as necessary until you find the best balance between loose and stiff movement. Most machinists find that the ideal gib adjustment is one where a small amount of drag or resistance is present yet the handwheels are still easy to move.

**Figures 124–128** show the location of the adjustment screws for each gib on this machine.



**Figure 124. Compound and cross slide gib adjustment screws.**

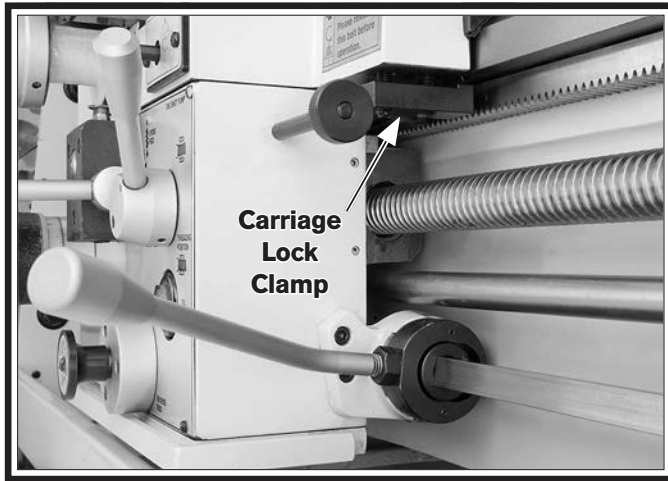


**Figure 125. One of two rear saddle gib adjustment screws.**



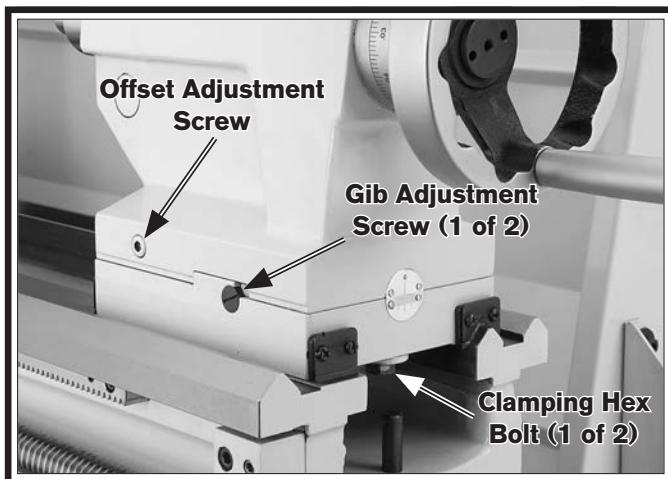
**Figure 126. Front saddle gib adjustment screw.**

**Note:** Remove the carriage lock clamp to access the saddle gib adjustment screw on the tailstock side (see **Figure 127**).



**Figure 127. Carriage lock clamp.**

**Note:** Before adjusting the tailstock gib, loosen the hex bolts underneath both ends of the tailstock (see **Figure 128**) to release the clamping pressure between the upper and lower castings. Test the gib adjustment by using the offset adjustment screws. When you are satisfied with the setting, retighten the clamping hex bolts.



**Figure 128. Tailstock gib adjustment controls.**

## Half Nut Adjustment

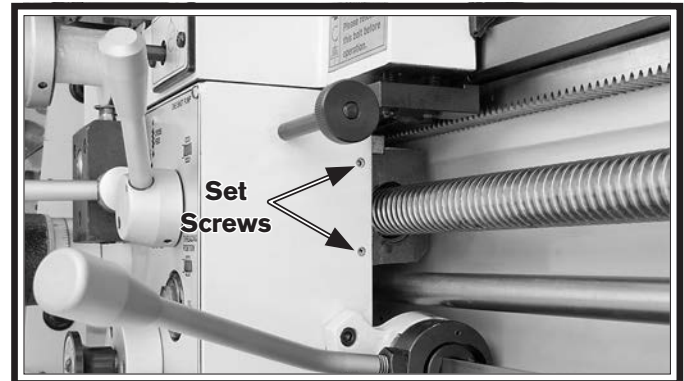
The clamping pressure of the half nut is fully adjustable with a gib that can be loosened or tightened by two set screws. Use this procedure to adjust the half nut if it becomes loose from wear, or it is too tight for your preferences. A half nut that is too loose will make it difficult to produce accurate work. A half nut that is too tight will increase the rate of wear on itself and the leadscrew.

|                      |            |
|----------------------|------------|
| <b>Tool Needed:</b>  | <b>Qty</b> |
| Hex Wrench 3mm ..... | 1          |

### To adjust the half nut:

1. Disengage the half nut, then remove the thread dial.
2. Turn the two set screws (see **Figure 129**) clockwise to tighten the half nut and counterclockwise to loosen it.

Make sure to turn the set screws in even amounts so one does not become tighter than the other.



**Figure 129. Half nut gib adjustment.**

3. Engage/disengage the half nut several times and notice how it feels. The half nut is correctly adjusted when it has a slight drag while opening and closing. The movement should not be too stiff or too sloppy.
4. Repeat **Steps 2–3**, if necessary, until you are satisfied with the half nut pressure.
5. Re-install the thread dial.



# Feed Rod Clutch Adjustment

The feed rod clutch helps protect the drivetrain from overload in the event of a crash, and it works with the adjustable apron stop system to disengage the feed rod from the apron. The feed clutch release point is adjusted at the factory. However, it can be re-adjusted to increase or decrease the load it will take before the clutch slips.

Keep in mind that correctly adjusting the feed rod clutch for your operation is a matter of trial-and-error and experience.

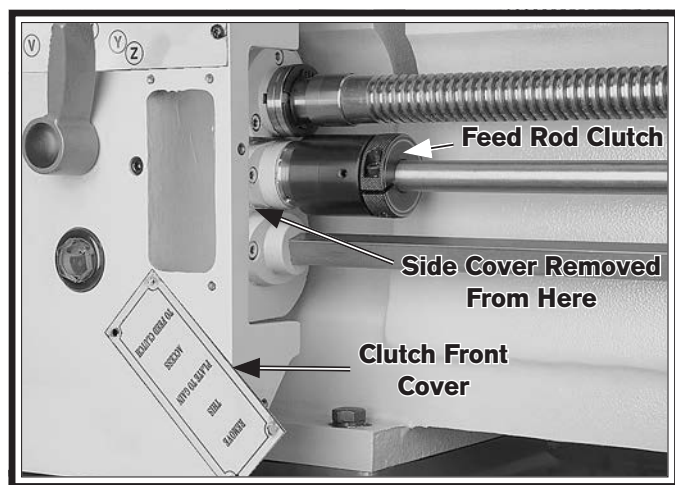
**NOTICE**

**Setting the feed clutch for too high of a load defeats its purpose and could lead to lathe damage in the event of a crash.**

| <b>Tools Needed:</b>   | <b>Qty</b> |
|------------------------|------------|
| Hex Wrench 2.5mm ..... | 1          |
| Hex Wrench 3mm .....   | 1          |

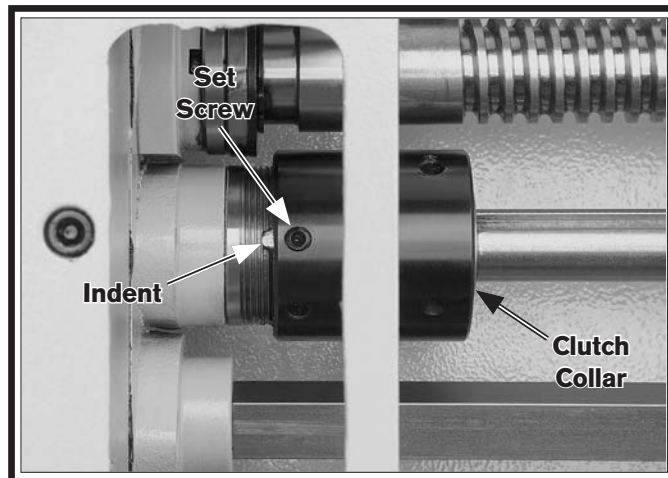
**To adjust the clutch release point:**

1. DISCONNECT LATHE FROM POWER!
2. Remove the clutch front and side covers (see **Figure 130**).



**Figure 130. Location of feed rod clutch (side cover removed for photo clarity).**

3. Open the end gear cover, then rotate the bottom end gear by hand until you can access the set screw in the clutch collar, as shown in **Figure 131**.



**Figure 131. Feed rod clutch collar components.**

4. Mark the set screw hole and the rotational position of the collar on the feed rod for a reference.
5. Remove the set screw shown in **Figure 131**.
6. Insert the hex wrench into one of the holes on the collar, then rotate the collar.
  - If you need to adjust the clutch for a higher load, rotate the collar upward.
  - If you need to adjust the clutch for a lower load, rotate the collar downward.
7. Line up one of the available set screw holes on the collar with the nearest indent in the feed rod, then re-install the set screw and fully tighten it.
8. When you are satisfied with the adjustment, replace the front and side access panels.

## V-Belts

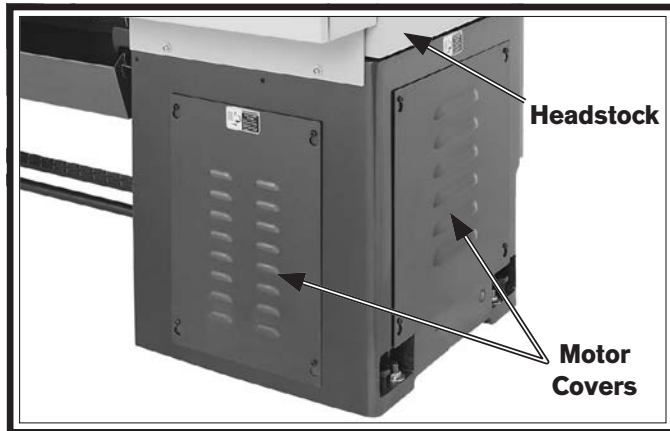
V-belts stretch and wear with use, so check them on a monthly basis to ensure optimal power transmission. Replace all of the V-belts if any of them show signs of glazing, fraying, or cracking.

### Tools Needed:

|                               | <b>Qty</b> |
|-------------------------------|------------|
| Phillips Screwdriver #2 ..... | 1          |
| Open End Wrench 24mm.....     | 1          |

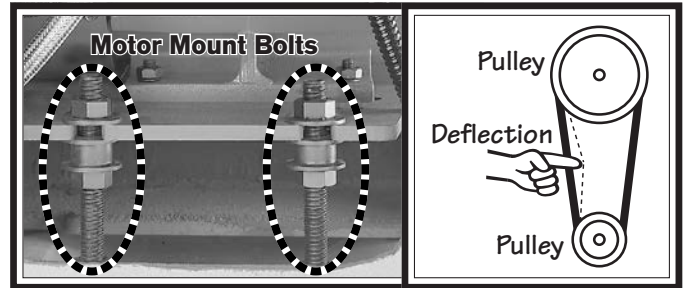
### To adjust the V-belts:

1. DISCONNECT LATHE FROM POWER!
2. Remove the motor covers shown in **Figure 132**.



**Figure 132. Locations of motor covers.**

3. Turn the hex nuts on the motor mount bolts shown in **Figure 133** to move the motor mount plate up or down and adjust the V-belt tension. When correctly tensioned, each belt should have about  $\frac{3}{4}$ " deflection when pressed firmly (see **Figure 133**).



**Figure 133. V-belt adjustment.**

4. Tighten the hex nuts against the both sides of the motor mount plate to prevent it from moving out of adjustment during operation, then re-install the motor covers.

## Brake & Switch

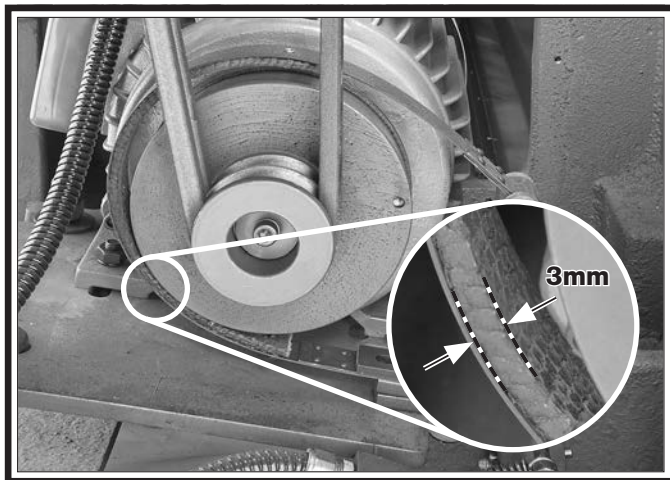
As the brake lining wears, the foot pedal develops more travel. If the brake band is not adjusted to compensate for normal wear, the limit switch will still turn the lathe off, but the spindle will not stop as quickly. It is especially important that the brake is kept properly adjusted so you can quickly stop the spindle in an emergency.

### Tools Needed:

|                               | Qty |
|-------------------------------|-----|
| Phillips Screwdriver #2 ..... | 1   |
| Hex Wrench 6mm .....          | 1   |

### To adjust the brake and brake switch:

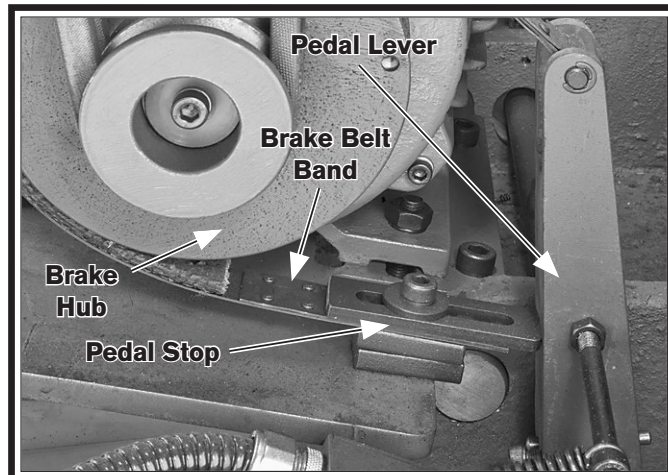
1. DISCONNECT LATHE FROM POWER!
2. Put on a respirator and eye protection to protect yourself from hazardous brake dust.
3. Remove the motor access panel from the left cabinet.
4. Measure the remaining brake band lining at the thinnest point, which is usually at the 8 o'clock position, as shown in **Figure 134**.



**Figure 134. Minimum brake belt thickness.**

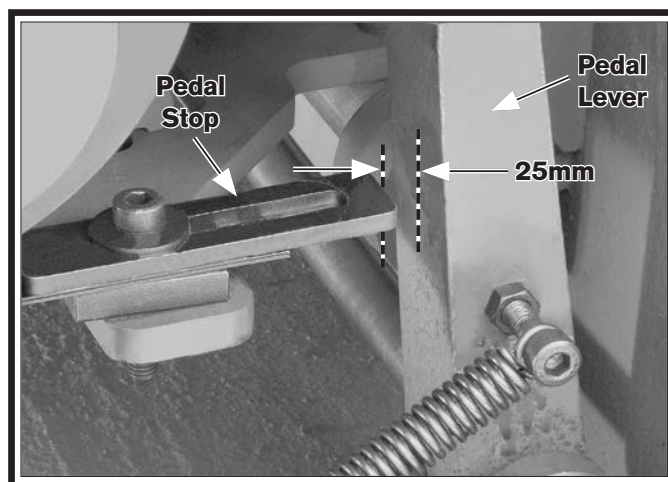
When the brake band is new, the lining is approximately 5mm thick. If the lining thickness wears 2.5mm or less, the brake band must be replaced. Otherwise, the rivets that secure the lining to the band will soon grind into the brake hub. If the hub becomes damaged, it must be replaced.

5. Remove the pedal stop shown in **Figure 135**.



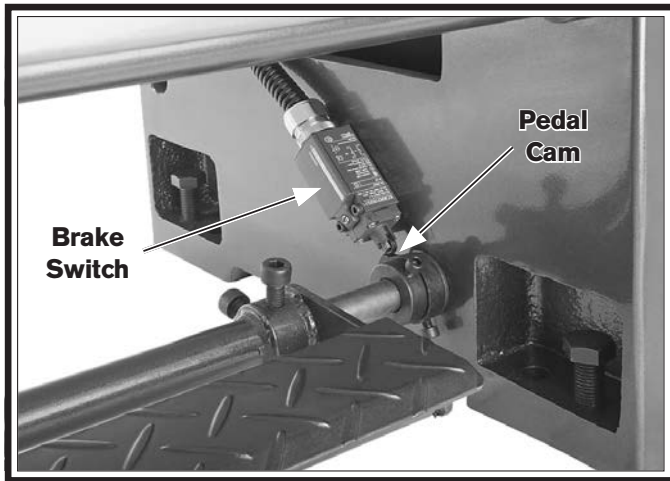
**Figure 135. Brake adjustment components.**

6. Move the brake band over one hole to the right, re-install the pedal stop, then re-tighten the cap screw until it is just snug.
- Note:** If installing a new brake band, install the cap screw so there is one available hole to the left for future brake adjustment.
7. Firmly push the pedal lever to the right until it stops and the brake band is fully clamped around the brake hub.
  8. Adjust the pedal stop approximately 25mm away from the pedal lever (see **Figure 136**), then tighten the pedal stop cap screw.



**Figure 136. Brake pedal travel adjustment.**

9. Locate the brake switch on the right side of the brake pedal (see **Figure 137**).



**Figure 137. Brake switch and pedal cam.**

10. Push the pedal lever down to verify that the cam lobe pushes the brake switch plunger in. When pushed in, the switch should click.

— If the switch does not click, loosen the switch mounting screws, push the brake pedal all the way down, then move the switch closer to the cam lobe until it clicks. Secure the switch in place at this location.

**Note:** When the brake pedal is released, there should be an approximate 3mm gap between the switch plunger and the cam lobe.

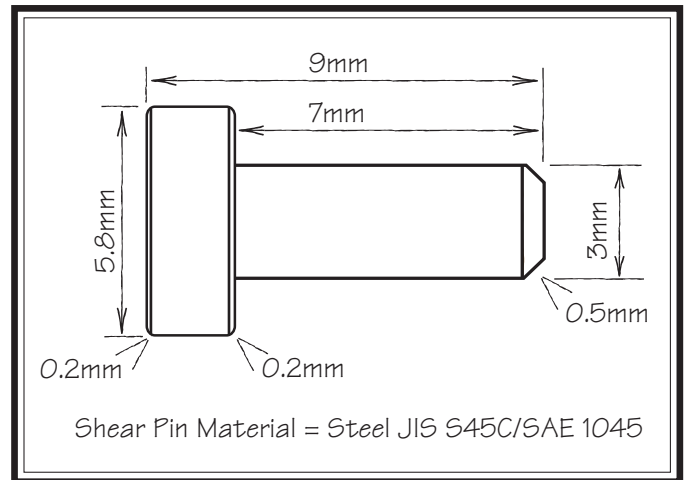
11. Re-install the motor access panel, connect the lathe to power, then test the brake pedal.

— If the brake does not operate correctly, properly repeat this procedure until it does.

## Leadscrew Shear Pin Replacement

The leadscrew is secured to a connecting collar that is part of the headstock drivetrain with the use of a soft-metal shear pin. The shear pin is designed to break and disengage the power transfer to the leadscrew to help protect more expensive lathe components in the case of a carriage crash or the lathe is overloaded.

Contact South Bend to order a replacement shear pin (Part Number PSB10530934) or use the specifications in **Figure 138** to fabricate your own.



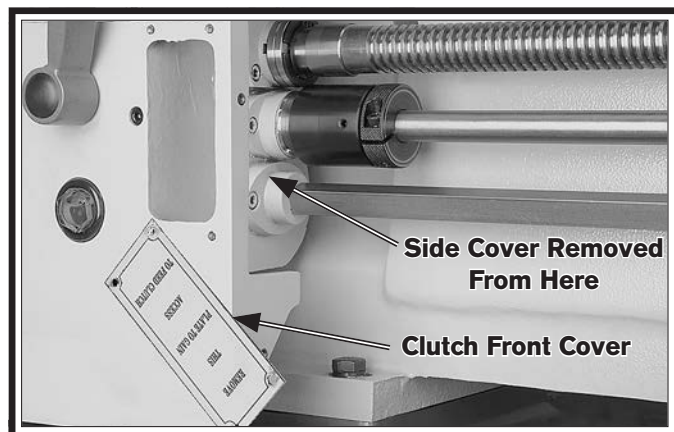
**Figure 138. Shear pin specifications.**

**Tools Needed:**

|  | <b>Qty</b> |
|--|------------|
| External Retaining Ring Pliers #1..... | 1          |
| Magnet.....                            | 1          |
| Safety Glasses .....                   | 1          |
| Blow Gun w/Compressed Air.....         | 1          |
| Light Machine Oil .....                | As needed  |

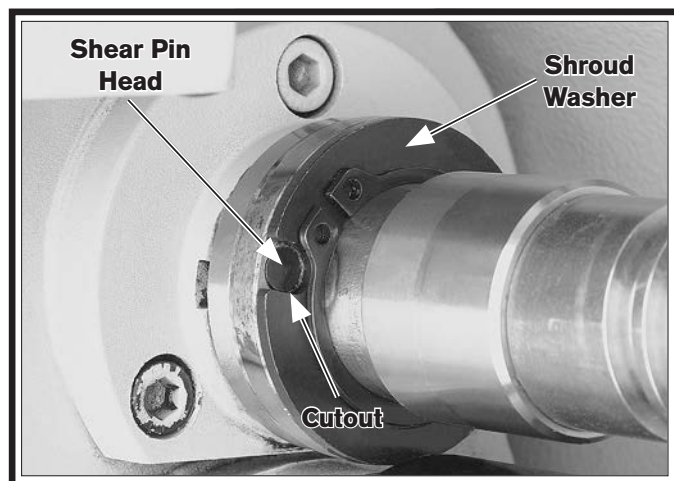
**To replace the shear pin:**

1. DISCONNECT LATHE FROM POWER!
2. Remove the clutch front and side covers (see **Figure 139**).



**Figure 139.** Location of clutch front cover (side cover removed for photo clarity).

3. Rotate the shroud washer on the leadscrew (see **Figure 140**) so that the cutout lines up with the shear pin head.



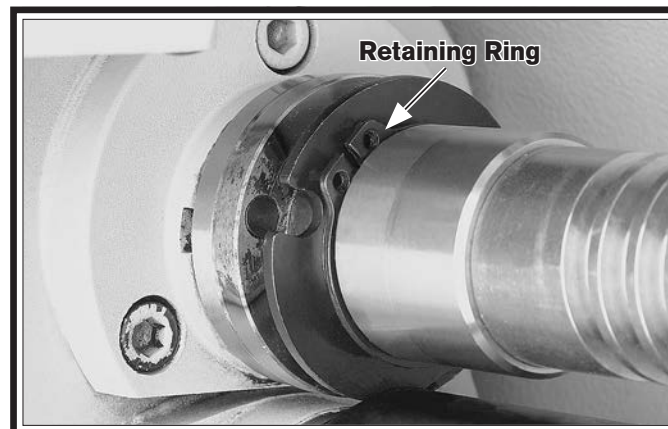
**Figure 140.** Shroud washer and shear pin alignment.

4. Put on safety glasses.

**NOTICE**

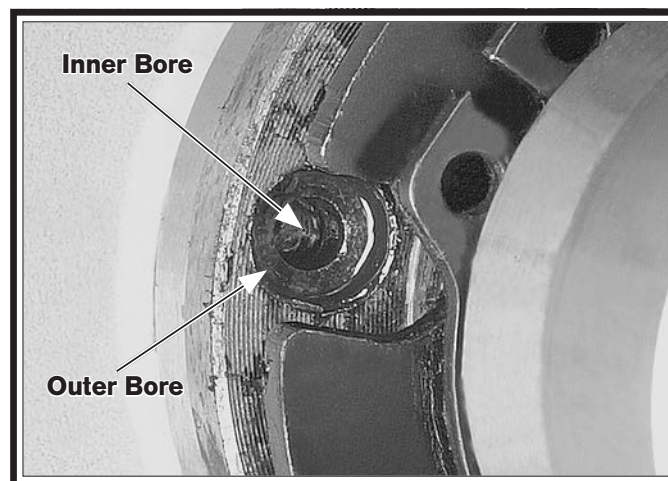
If you fabricate your own shear pin, make sure to use the material and dimensions specified in **Figure 138**. Otherwise, the shear pin may not provide the intended protection and lathe damage could result.

5. Move the retaining ring shown in **Figure 141** away from the shroud washer, then move the shroud washer away from the shear pin and against the retaining ring. This will create room for you to remove the shear pin.



**Figure 141.** Shear pin access.

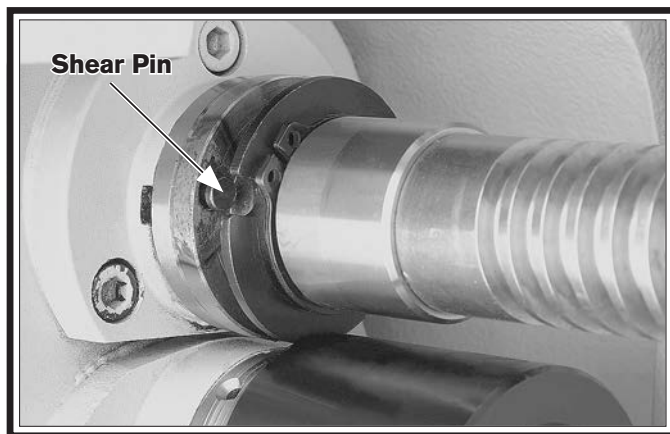
6. Use the magnet to remove the shear pin head.
7. Rotate the lathe spindle to line up the inner and outer bores, as shown in **Figure 142**, and use the magnet to remove the other half of the broken shear pin.



**Figure 142.** Shear pin bores aligned.

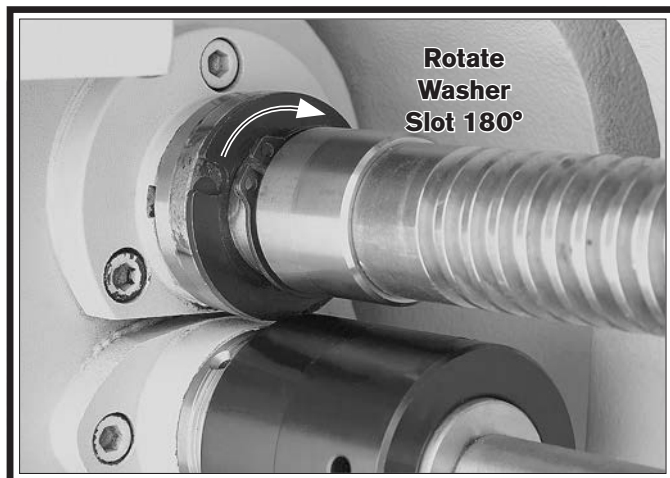
8. Insert the blow gun tip into the shear pin hole, blow out the hole with compressed air, then put a drop of oil in the hole.
9. Insert the new shear pin into the bore, as shown in **Figure 143**.

**Note:** If the pin does not freely slide into the bore, DO NOT use a hammer on the pin or you may permanently damage the shear mechanism and bore, which would make it nearly impossible to remove if it breaks again. Instead, take the time to carefully line up the two bores so it slides in easily. Chamfer the end of the pin if necessary to make it easier to insert.



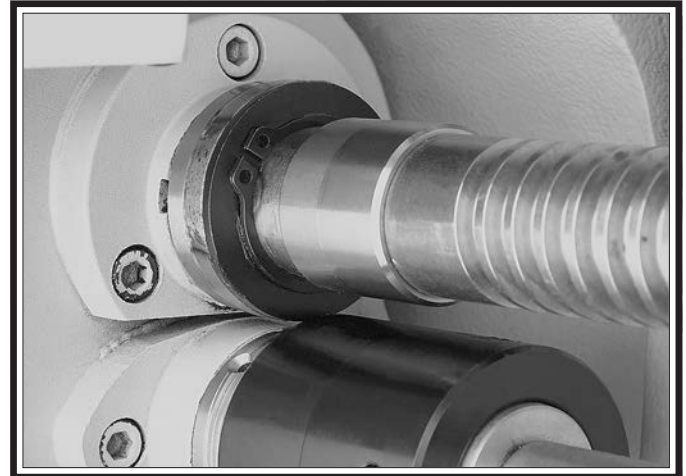
**Figure 143.** New shear pin installed in bore.

10. With the pin completely seated in the bore and the head flush with the leadscrew shoulder, slide the shroud washer against the shoulder, then rotate the washer 180° to completely cover the head of the shear pin, as shown in **Figure 144**.



**Figure 144.** Shroud washer positioning.

11. Return the retaining ring against the shroud washer and position the retaining ring ears over the shear pin head, as shown in **Figure 145**. This will prevent the shear pin from falling out if the shroud washer should rotate during operation.



**Figure 145.** Retaining ring positioned with ears in front of pin access groove.

12. Replace the clutch front and side covers.

# Gap Insert Removal & Installation

The gap insert directly under the spindle (see **Figure 146**) can be removed to create additional space for turning large diameter parts.

The gap insert was installed, then ground flush with the bed at the factory to ensure a precision fit and alignment. Therefore, if the gap insert is removed, it may be difficult to re-install with the same degree of accuracy.

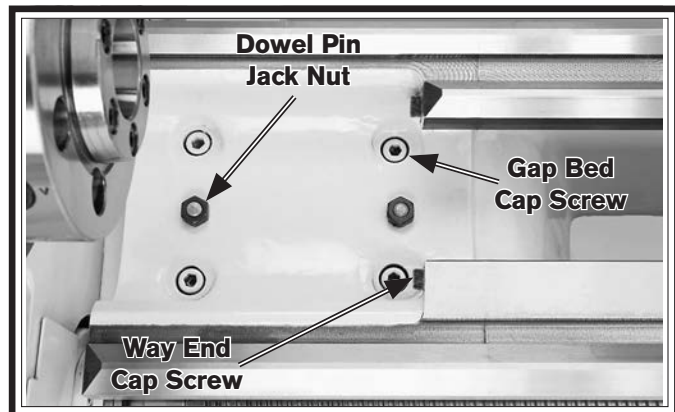


**Figure 146. Gap insert.**

| <b>Tools Needed:</b>   | <b>Qty</b> |
|------------------------|------------|
| Hex Wrenches 6mm ..... | 1          |
| Hex Wrench 8mm .....   | 1          |
| Wrench 17mm .....      | 1          |
| Dead Blow Hammer.....  | 1          |

## Gap Removal

1. Remove the four gap-bed cap screws, shown in **Figure 147**.



**Figure 147. Fasteners holding gap in place.**

2. Remove the two way-end cap screws.
3. Tighten the two dowel-pin jack nuts until the pins are pulled free from the gap insert.
4. Tap the outside of the gap insert with a dead blow hammer to loosen it, then remove it.

## Gap Installation

1. Use mineral spirits and a clean lint-free rag to clean the mating surfaces of the gap, bed, and ways. If necessary, stone the mating surfaces to remove scratches, dings, or burrs.
2. Wipe a thin layer of light machine oil on the mating surfaces.
3. Place the gap insert into the gap and use a dead-blow hammer to align the insert with the lathe bed.
4. Back off the dowel pin jack nuts, and lightly tap the dowel pins back into their respective holes until they are seated. This process will further help align the gap insert and bed mating surfaces.
5. Install all fasteners and lightly snug them in place.
6. Mount a dial indicator with a magnetic base to the top of the saddle to indicate alignment.
7. First test the peak of the two prisms of the gap insert that the saddle rides on, then test the flanks of the prisms.
8. Tighten the gap bed cap screws in an alternating manner and tap the side of the gap insert into alignment.
9. Inspect the gap alignment 24 hours later to make sure the gap is still aligned. If necessary, loosen the gap bed cap screws and repeat **Steps 7-8** until the insert is properly aligned.

If you need replacement parts, or if you are unsure how to do any of the solutions given here, feel free to call us at (360) 734-1540.

| Symptom   | Possible Cause   | Possible Solution   |
|---|--|---|
| Machine does not start or a circuit breaker trips.              | <ol style="list-style-type: none"> <li>(First time operation only) Lathe is wired out of phase.</li> <li>Stop button is engaged or at fault.</li> <li>Spindle switch(es) are at fault.</li> <li>Power supply is switched <b>OFF</b> at master power switch or breaker.</li> <li>Wall fuse/circuit breaker is blown/tripped; short in electrical system; start-up load too high for circuit.</li> <li>Fuse has blown in machine electrical box.</li> <li>One or more safety switches or brake switch are engaged.</li> <li>Thermal overload relay has tripped.</li> <li>Motor connection wired incorrectly.</li> <li>Safety/brake switch(es) at fault.</li> <li>Contactors not getting energized/has burned contacts.</li> <li>Wiring is open/has high resistance.</li> <li>Motor is at fault.</li> </ol> | <ol style="list-style-type: none"> <li>Correct out-of-phase wiring (refer to <b>Page 90</b> for details).</li> <li>Rotate button clockwise until it pops out to reset it for operation; replace if not working properly.</li> <li>Replace bad switch(es).</li> <li>Make sure master power switch and circuit breaker are turned <b>ON</b>.</li> <li>Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; replace weak breaker; find/repair electrical short.</li> <li>Replace fuse; determine if overload is due to heavy operation; ensure power source has high enough voltage and power cord is correctly sized.</li> <li>Verify electrical box door, chuck guard, spindle, and brake switches are not engaged.</li> <li>Turn the thermal relay cut-out dial to increase working amps and push the reset pin. Replace if tripped multiple times (weak relay).</li> <li>Correct motor wiring connections.</li> <li>Test all switches and replace as necessary.</li> <li>Test for power on all legs and contactor operation. Replace unit if faulty.</li> <li>Check for broken wires or disconnected/corroded connections, and repair/replace as necessary.</li> <li>Test/repair/replace.</li> </ol> |
| Loud, repetitious noise coming from lathe at or near the motor. | <ol style="list-style-type: none"> <li>Pulley set screws or keys are missing or loose.</li> <li>Motor fan is hitting the cover.</li> </ol>   | <ol style="list-style-type: none"> <li>Inspect keys and set screws. Replace or tighten if necessary.</li> <li>Tighten fan, shim cover, or replace items.</li> </ol>   |
| Motor overheats.  | <ol style="list-style-type: none"> <li>Motor overloaded.</li> </ol>  | <ol style="list-style-type: none"> <li>Reduce load on motor.</li> </ol>   |
| Motor is loud when cutting, or bogs down under load.            | <ol style="list-style-type: none"> <li>Excessive depth of cut or feed rate.</li> <li>Spindle speed or feed rate wrong for cutting operation.</li> <li>Cutting tool is dull.</li> </ol>   | <ol style="list-style-type: none"> <li>Decrease depth of cut or feed rate.</li> <li>Refer to the feeds and speeds charts in <b>Machinery's Handbook</b> or a speeds and feeds calculator on the internet.</li> <li>Sharpen or replace the cutting tool.</li> </ol>  |



| Symptom  | Possible Cause  | Possible Solution  |
|--|---|--|
| Entire machine vibrates upon startup and while running.                | <ol style="list-style-type: none"> <li>1. Workpiece is unbalanced.</li> <li>2. Loose or damaged V-belt(s).</li> <li>3. V-belt pulleys are not properly aligned.</li> <li>4. Worn or broken gear present.</li> <li>5. Chuck or faceplate is unbalanced.</li> <li>6. Gears not aligned in headstock or no backlash.</li> <li>7. Broken gear or bad bearing.</li> <li>8. Workpiece is hitting stationary object.</li> <li>9. Spindle bearings at fault.</li> </ol> | <ol style="list-style-type: none"> <li>1. Re-install workpiece as centered with the spindle bore as possible.</li> <li>2. Re-tension/replace the V-belt(s) as necessary (see <b>Page 80</b>).</li> <li>3. Align the V-belt pulleys.</li> <li>4. Inspect gears and replace if necessary.</li> <li>5. Re-balance chuck or faceplate; contact a local machine shop for help.</li> <li>6. Adjust gears and establish backlash.</li> <li>7. Replace broken gear or bearing.</li> <li>8. Stop lathe immediately and correct interference problem.</li> <li>9. Reset spindle bearing preload or replace worn spindle bearings.</li> </ol> |
| Bad surface finish.  | <ol style="list-style-type: none"> <li>1. Wrong spindle speed or feed rate.</li> <li>2. Dull tooling or poor tool selection.</li> <li>3. Tool height not at centerline.</li> <li>4. Too much play in gibs.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Adjust for appropriate spindle speed and feed rate.</li> <li>2. Sharpen tooling or select a better tool for the intended operation.</li> <li>3. Adjust tool height to centerline (see <b>Page 49</b>).</li> <li>4. Tighten gibs (see <b>Page 77</b>).</li> </ol>   |
| Tapered tool difficult to remove from tailstock quill.                 | <ol style="list-style-type: none"> <li>1. Quill is not retracted all the way back into the tailstock.</li> <li>2. Contaminants not removed from taper before inserting into quill.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Turn the tailstock handwheel until it forces the tapered tool out of quill.</li> <li>2. Clean the taper and bore and re-install tapered tool.</li> </ol>   |
| Cross slide, compound, or carriage feed has sloppy operation.          | <ol style="list-style-type: none"> <li>1. Gibs are out of adjustment.</li> <li>2. Handwheel is loose or backlash is high.</li> <li>3. Leadscrew mechanism worn or out of adjustment.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Adjust gib screw(s) (see <b>Page 77</b>).</li> <li>2. Tighten handwheel fasteners, adjust handwheel backlash to a minimum (see <b>Page 75</b>).</li> <li>3. Adjust leadscrew to remove end play (see <b>Page 76</b>).</li> </ol>   |
| Cross slide, compound, or carriage feed handwheel is hard to move.     | <ol style="list-style-type: none"> <li>1. Dovetail slides loaded with shavings, dust, or grime.</li> <li>2. Gib screws are too tight.</li> <li>3. Backlash setting too tight (cross slide only).</li> <li>4. Bedways are dry.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Remove gibs, clean ways/dovetails, lubricate, and re-adjust gibs.</li> <li>2. Loosen gib screw(s) slightly, and lubricate bedways (see <b>Page 77</b>).</li> <li>3. Slightly loosen backlash setting (see <b>Page 76</b>).</li> <li>4. Lubricate bedways and handles.</li> </ol>   |
| Cutting tool or machine components vibrate excessively during cutting. | <ol style="list-style-type: none"> <li>1. Tool holder not tight enough.</li> <li>2. Cutting tool sticks too far out of tool holder; lack of support.</li> <li>3. Gibs are out of adjustment.</li> <li>4. Dull cutting tool.</li> <li>5. Incorrect spindle speed or feed rate.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Check for debris, clean, and retighten.</li> <li>2. Re-install cutting tool so no more than <math>\frac{1}{3}</math> of the total length is sticking out of tool holder.</li> <li>3. Adjust gib screws at affected component (see <b>Page 77</b>).</li> <li>4. Replace or resharpen cutting tool.</li> <li>5. Use the recommended spindle speed.</li> </ol>  |

| <b>Symptom</b>                                   | <b>Possible Cause</b>  | <b>Possible Solution</b>   |
|--|--|--|
| Workpiece is tapered.                            | <ol style="list-style-type: none"> <li>1. Headstock and tailstock are not properly aligned with each other.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Realign the tailstock to the headstock spindle bore centerline (see <b>Page 42</b>).</li> </ol>  |
| Chuck jaws will not move or do not move easily.  | <ol style="list-style-type: none"> <li>1. Chips lodged in the jaws or scroll plate.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Remove jaws, clean and lubricate scroll plate, then replace jaws.</li> </ol>   |
| Carriage will not feed, or is hard to move.      | <ol style="list-style-type: none"> <li>1. Gears are not all engaged.</li> <li>2. Loose screw on the feed handle.</li> <li>3. Carriage lock is tightened down.</li> <li>4. Chips have loaded up on bedways.</li> <li>5. Bedways are dry and in need of lubrication.</li> <li>6. Micrometer stop is interfering.</li> <li>7. Gibs are too tight.</li> <li>8. Gears or shear pin broken.</li> </ol> | <ol style="list-style-type: none"> <li>1. Adjust gear levers.</li> <li>2. Tighten.</li> <li>3. Check to make sure the carriage lock bolt is fully released.</li> <li>4. Frequently clean away chips that load up during turning operations.</li> <li>5. Lubricate bedways and handles.</li> <li>6. Check micrometer stop position, and adjust it as necessary (see <b>Page 50</b>).</li> <li>7. Loosen gib screw(s) slightly (see <b>Page 77</b>).</li> <li>8. Replace gears or shear pin (see <b>Page 83</b>).</li> </ol> |
| Gear change levers will not shift into position. | <ol style="list-style-type: none"> <li>1. Gears not aligned inside headstock.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Rotate spindle by hand with light pressure on the lever until gear falls into place.</li> </ol>  |

# Electrical Safety Instructions

These pages are accurate at the time of printing. In the constant effort to improve, however, we may make changes to the electrical systems of future machines. Study this section carefully. If you see differences between your machine and what is shown in this section, call Technical Support at (360) 734-1540 for assistance BEFORE making any changes to the wiring on your machine.

**Shock Hazard:** It is extremely dangerous to perform electrical or wiring tasks while the machine is connected to the power source. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. For your own safety, disconnect machine from the power source before servicing electrical components or performing any wiring tasks!

**Wire Connections:** All connections must be tight to prevent wires from loosening during machine operation. Double-check all wires disconnected or connected during any wiring task to ensure tight connections.

**Modifications:** Using aftermarket parts or modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire.

**Motor Wiring:** The motor wiring shown in these diagrams is current at the time of printing, but it may not match your machine. Always use the wiring diagram inside the motor junction box.

**Circuit Requirements:** Connecting the machine to an improperly sized circuit will greatly increase the risk of fire. To minimize this risk, only connect the machine to a power circuit that meets the minimum requirements given in this manual.

**Capacitors/Inverters:** Some capacitors and power inverters store an electrical charge for up to 10 minutes after being disconnected from the power source. To reduce the risk of being shocked, wait at least this long before working on capacitors.

**Wire/Component Damage:** Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components before completing the task.

**Experiencing Difficulties:** If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (360) 734-1540.

## WIRING DIAGRAM COLOR KEY

|            |                 |                 |                 |                   |
|------------|-----------------|-----------------|-----------------|-------------------|
| BLACK — Bk | BLUE WHITE — Bw | RED — Rd        | PINK — Pk       | WHITE — Wt        |
| BLUE — Bl  | GREEN — Gn      | LIGHT BLUE — Lb | PURPLE — Pu     | YELLOW GREEN — Yg |
| BROWN — Br | GRAY — Gy       | ORANGE — Or     | TUR-QUIOSE — Tu | YELLOW — Yl       |

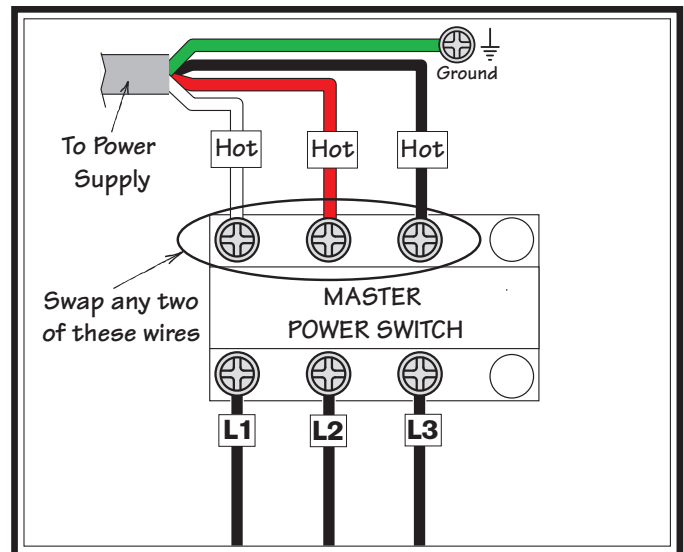
**NOTICE:** The photos and diagrams included in this section are best viewed in color. You can see them in color at [www.southbendlathe.com](http://www.southbendlathe.com).

## Correcting Phase Polarity Wiring

This sub-section is only provided for troubleshooting. If you discover during the test run that the lathe will not operate, or that the spindle runs backwards, the lathe may be wired out of phase. Without the proper test equipment to determine the phase of power source legs, wiring machinery to 3-phase power may require trial-and-error. Correcting this is simply a matter of reversing the positions where two of the incoming power source wires are connected.

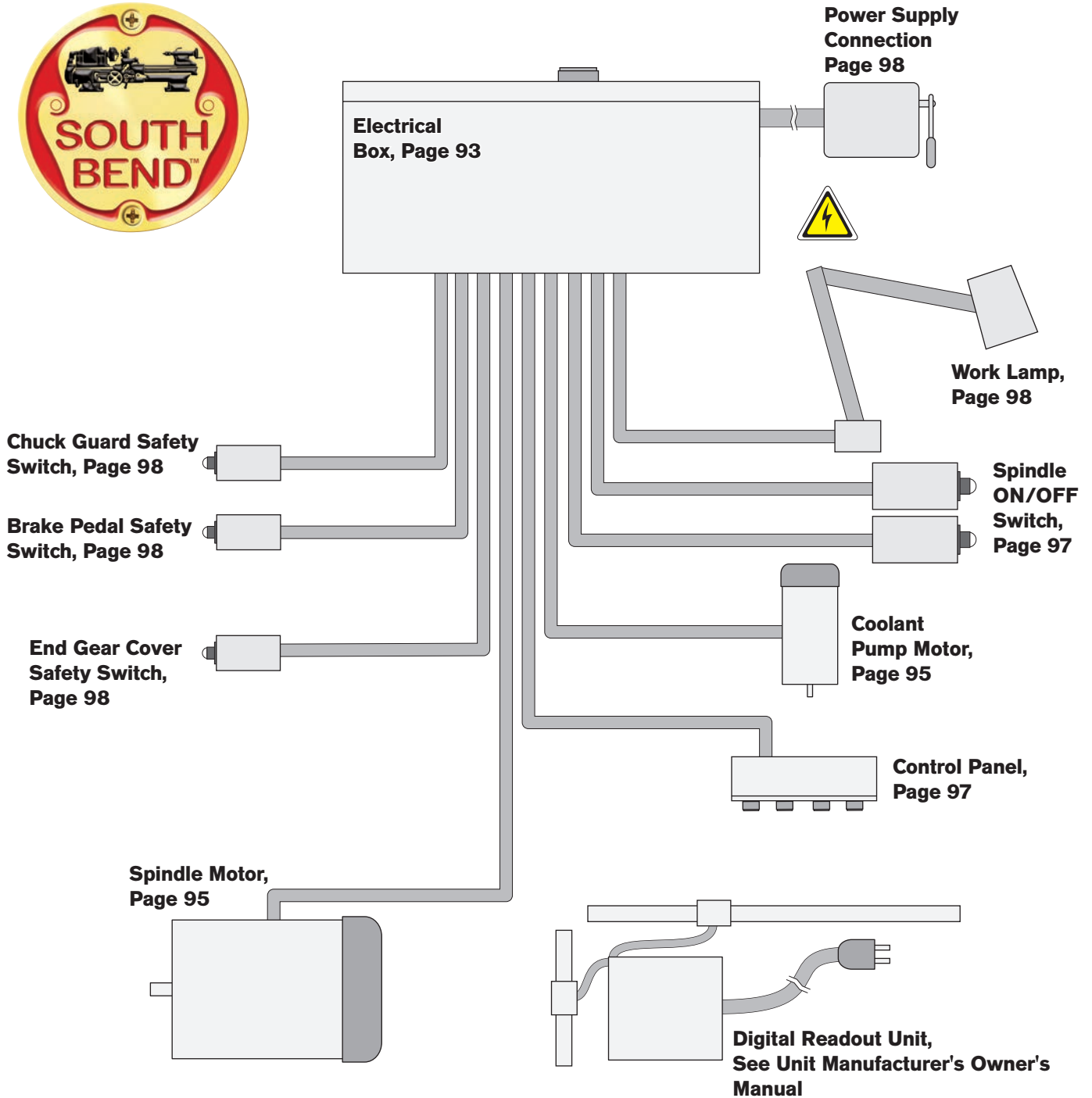
### To correct wiring that is out of phase:

1. Push the STOP button, turn the master power switch to OFF, and disconnect the machine from power.
2. Open the electrical box and swap any two hot wires coming from the plug, as illustrated in **Figure 148**.
3. Close and latch the electrical box, and reconnect the machine to the power source.



**Figure 148. Swapping L1 and L2 power connections to correct out-of-phase wiring.**

# Wiring Overview



# Component Location Index

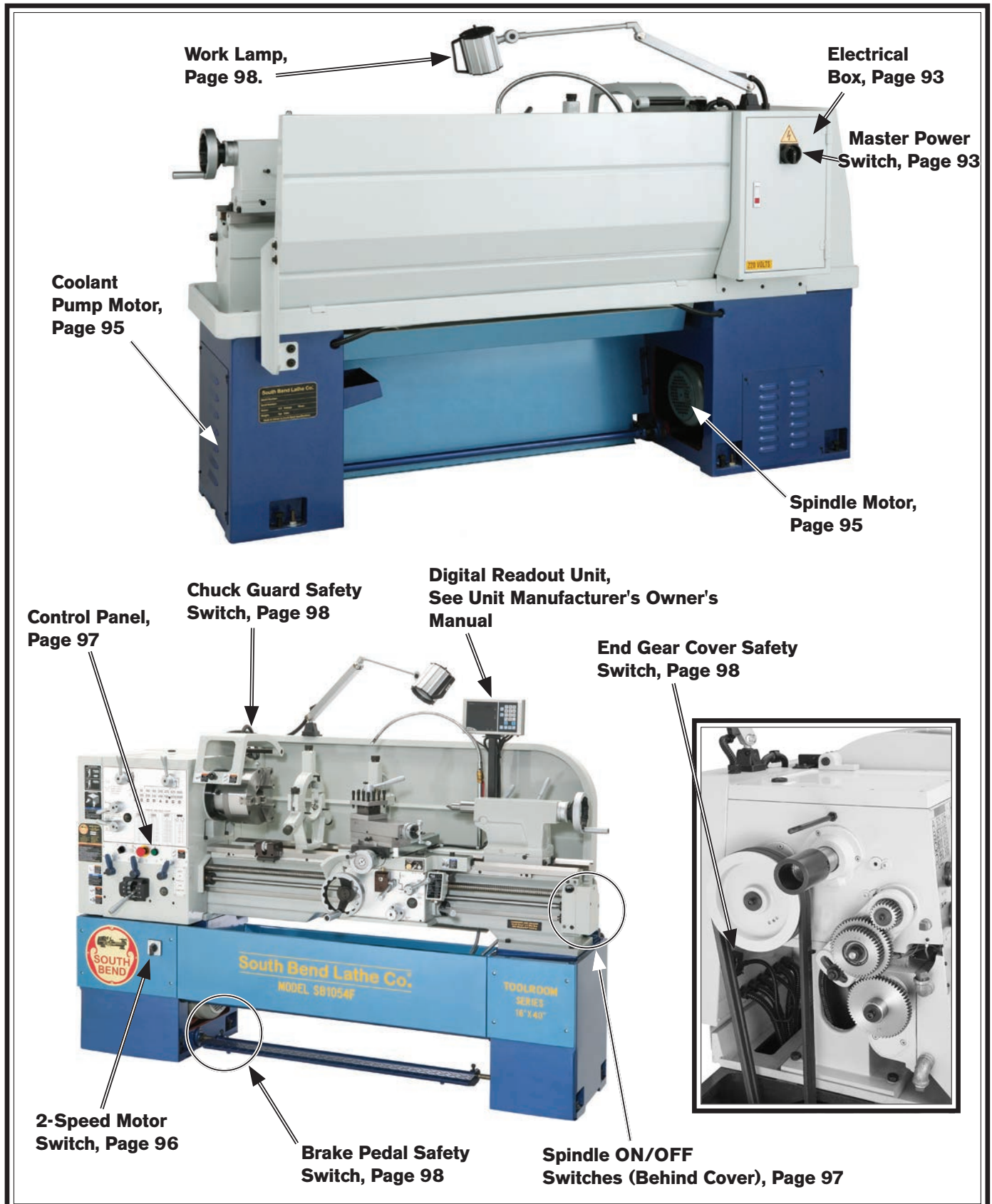
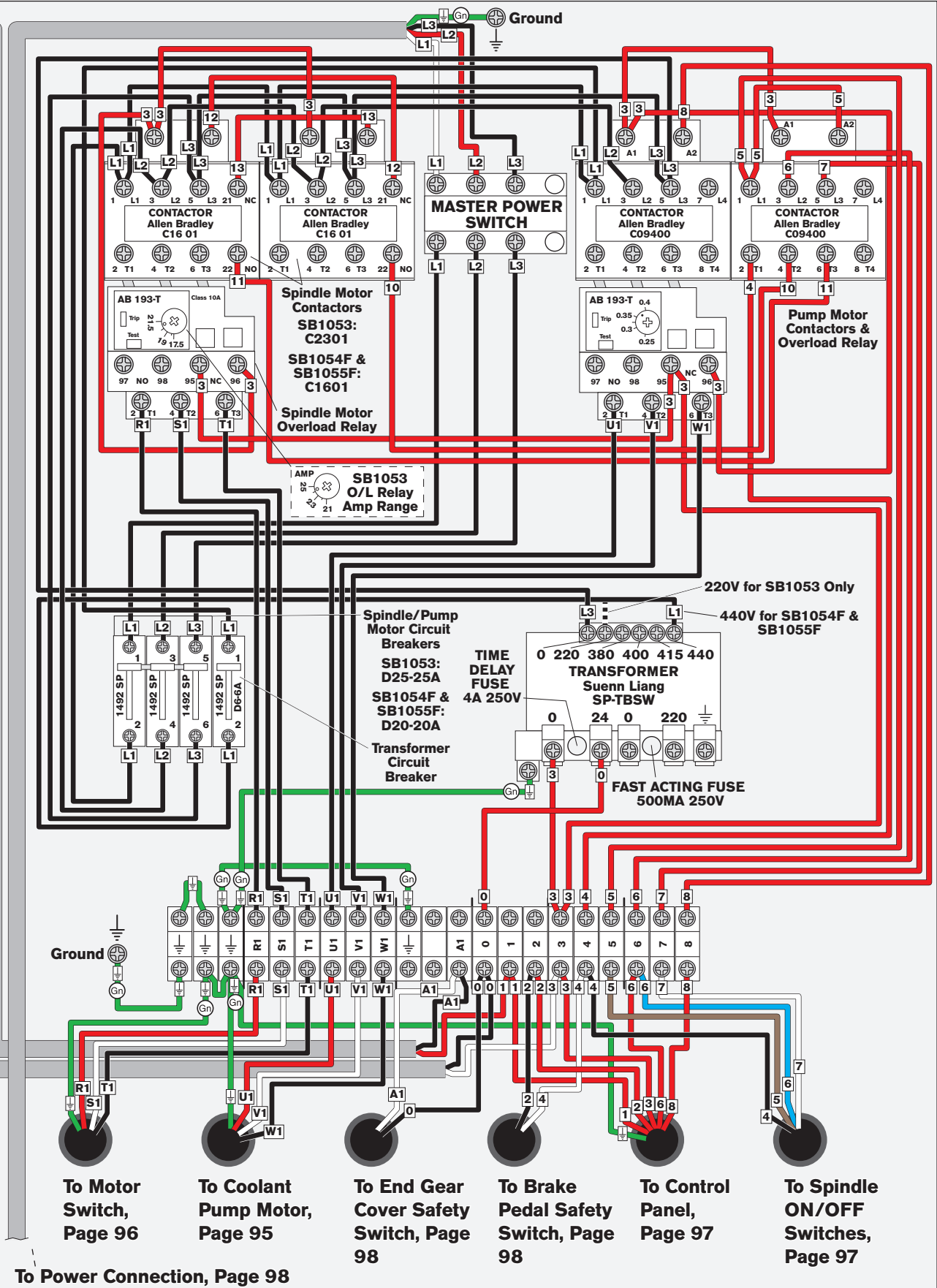


Figure 149. Component location index.

# Electrical Box Wiring

To Chuck Guard Safety Switch, Page 98 To Work Lamp, Page 98



# Electrical Box

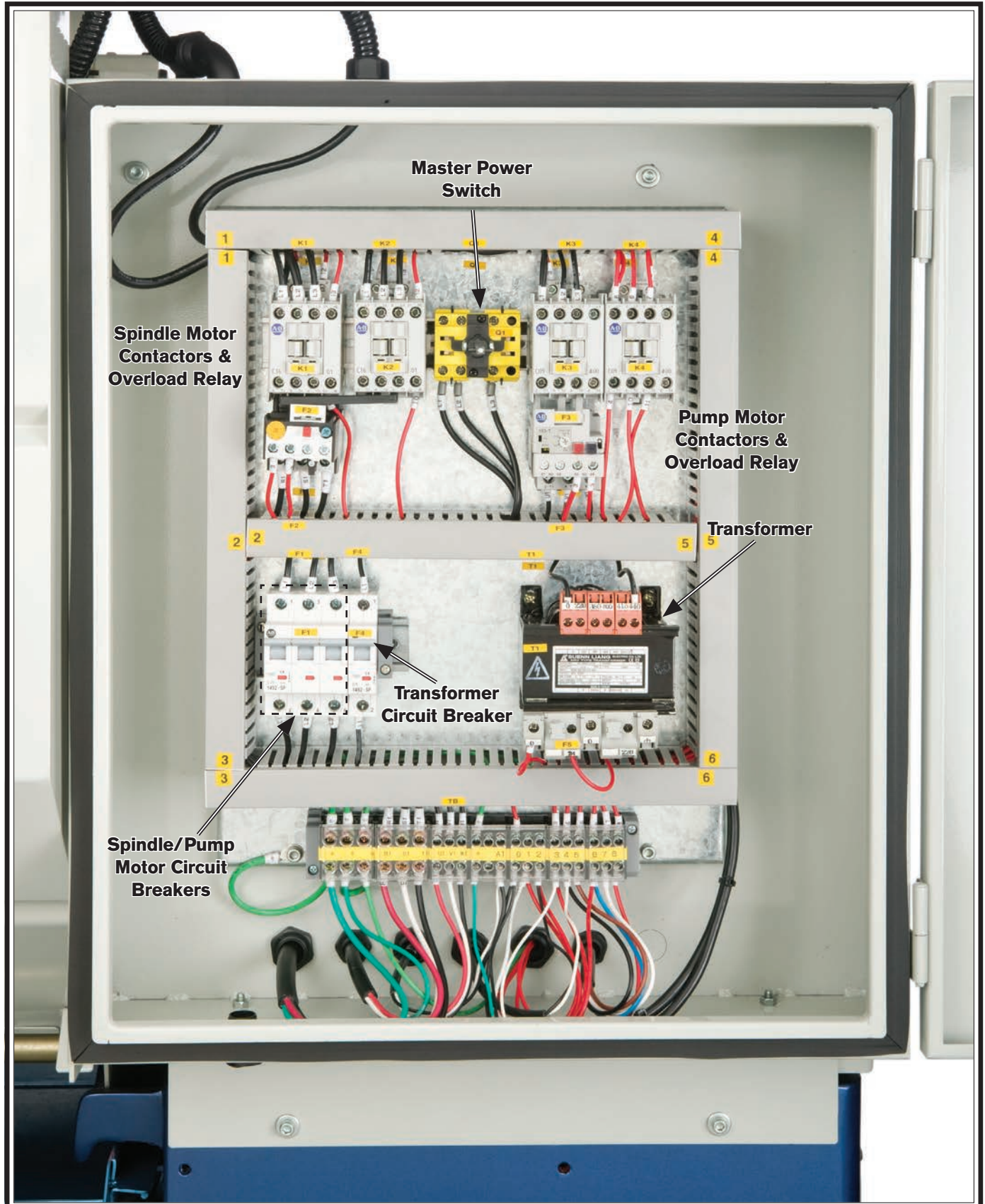


Figure 150. Electrical box.



# Spindle Motor

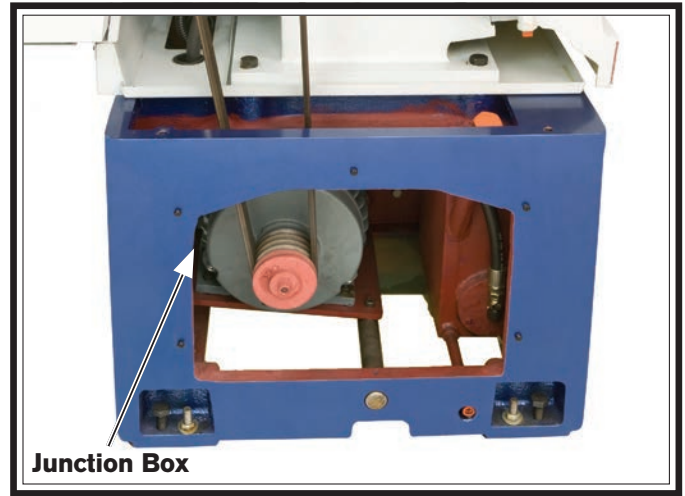
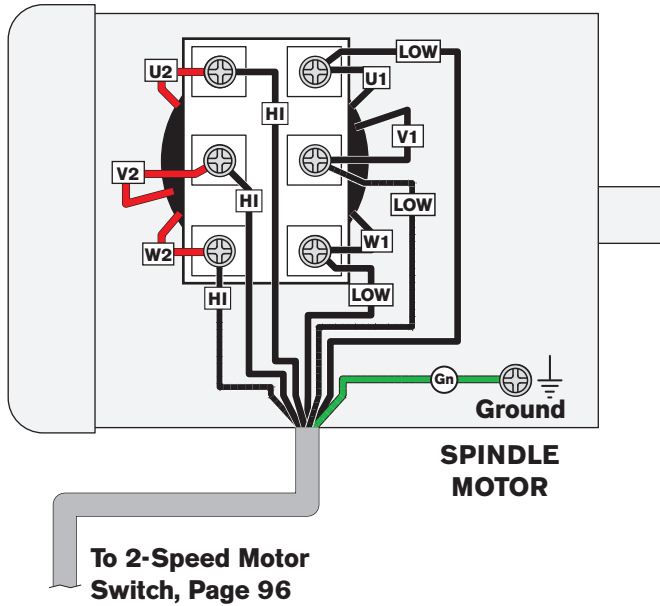


Figure 151. Spindle motor location.

# Coolant Pump Wiring

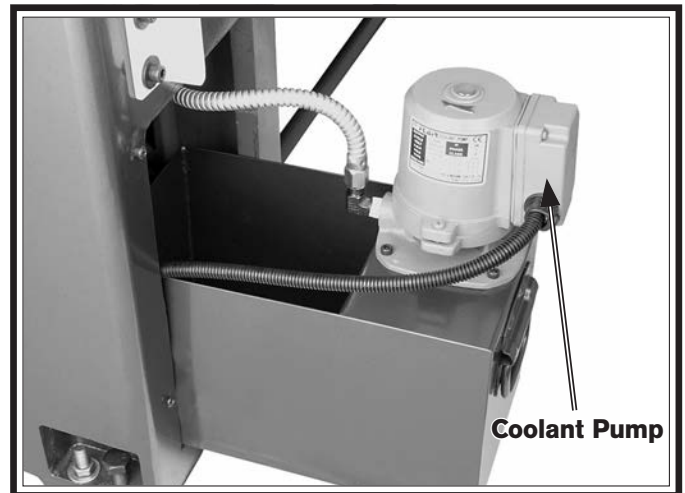
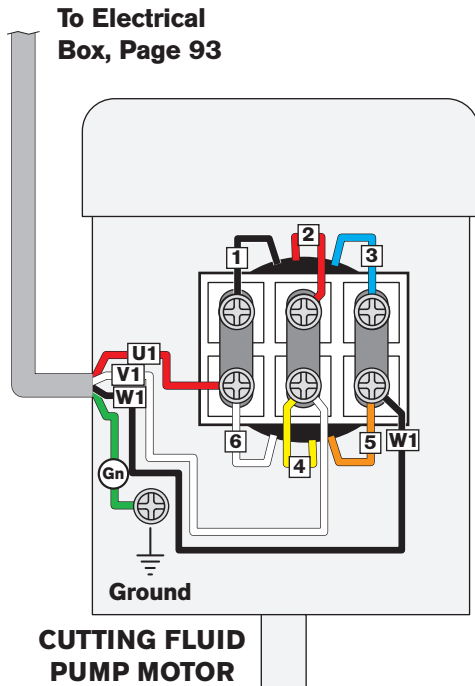


Figure 152. Coolant pump location.

# 2-Speed Motor Switch

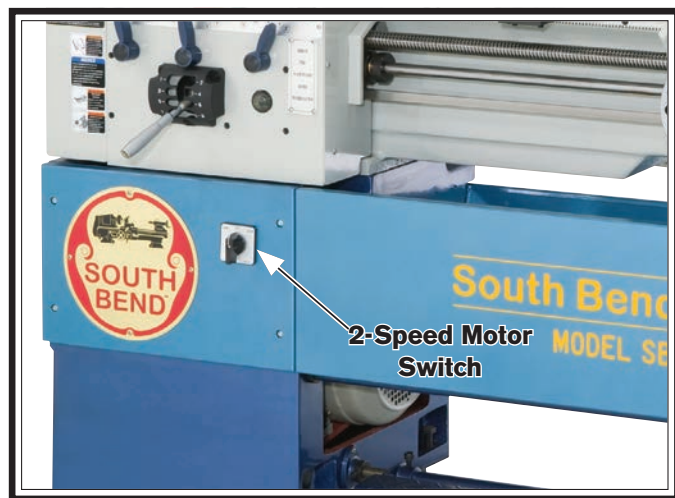
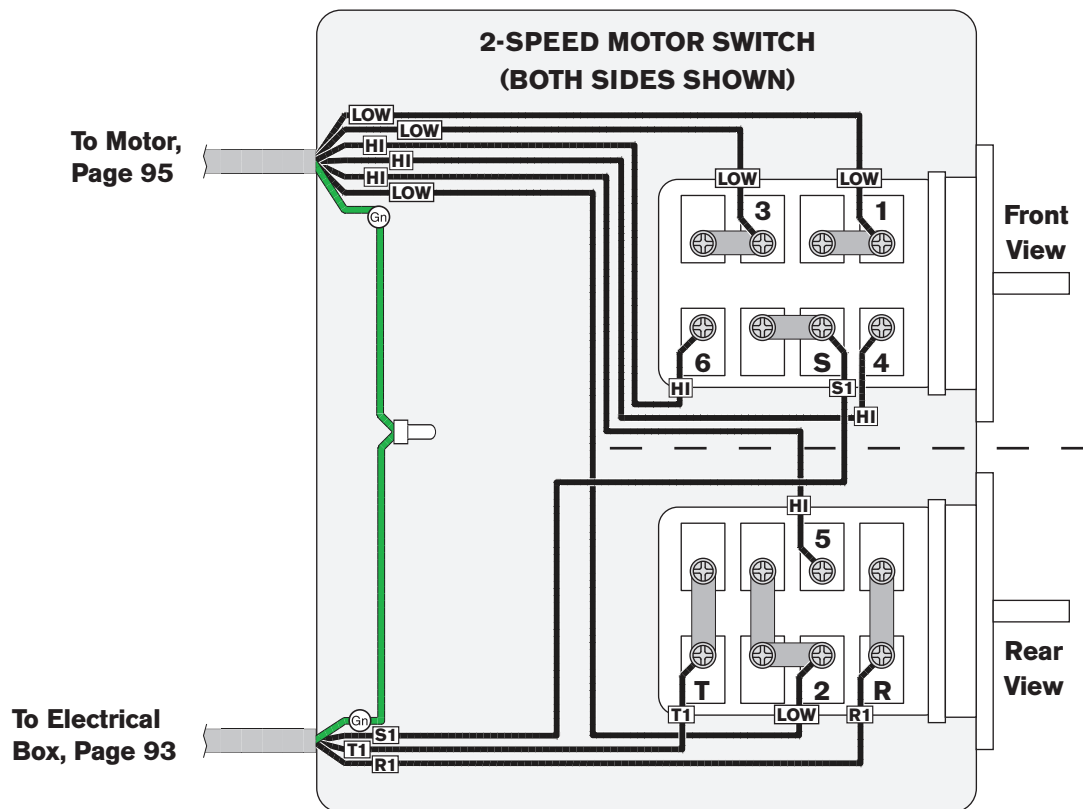


Figure 153. 2-Speed motor switch.

# Control Panel Wiring

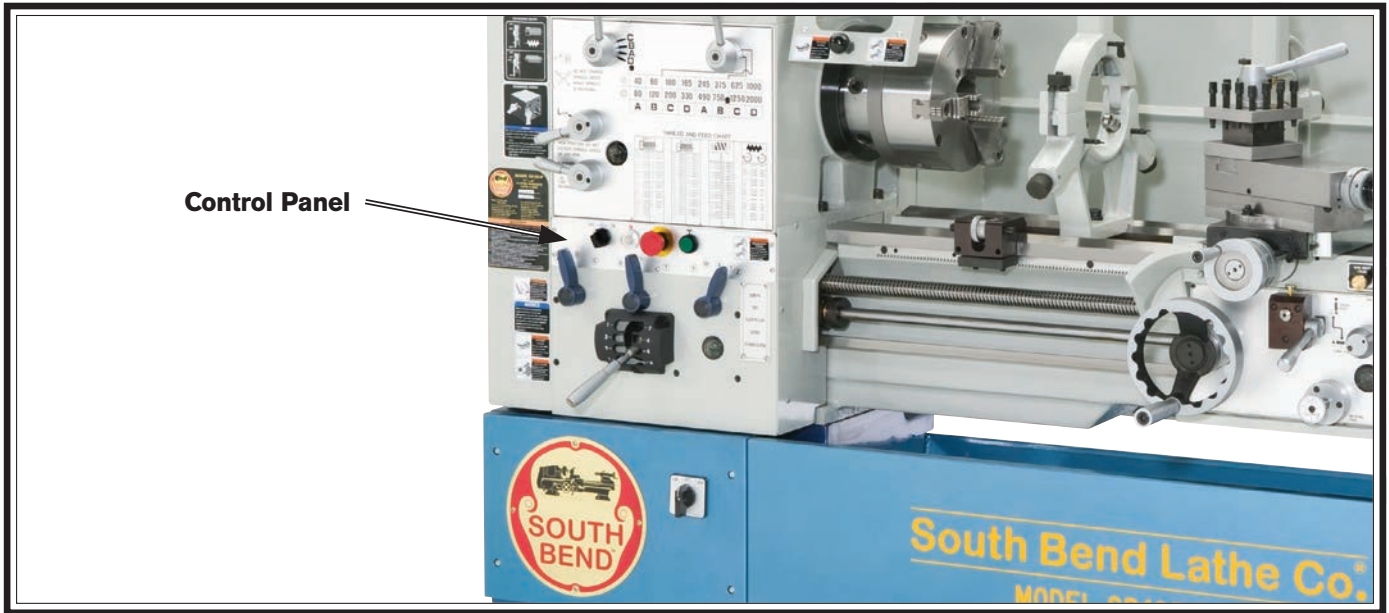
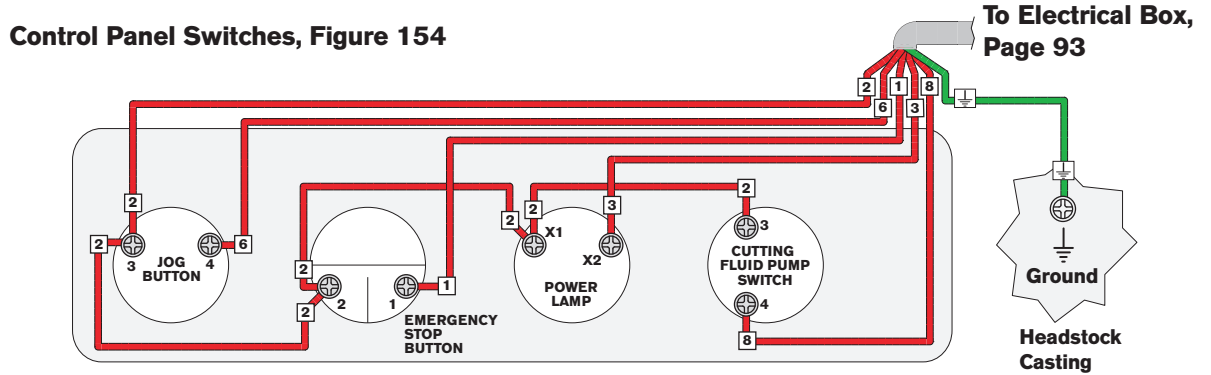


Figure 154. Control panel location.



# Spindle ON/OFF Switches

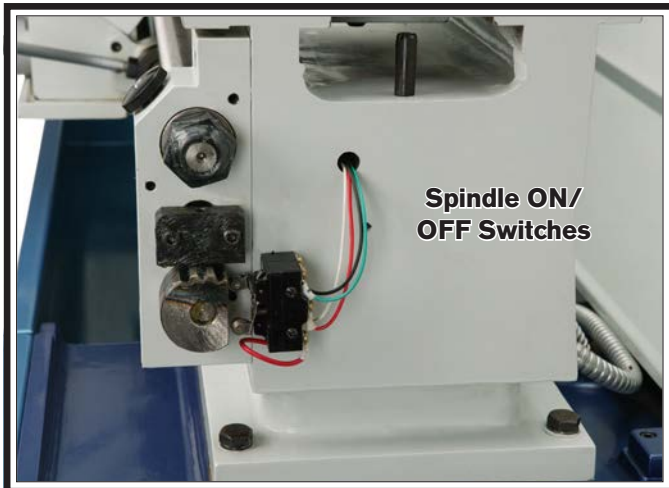
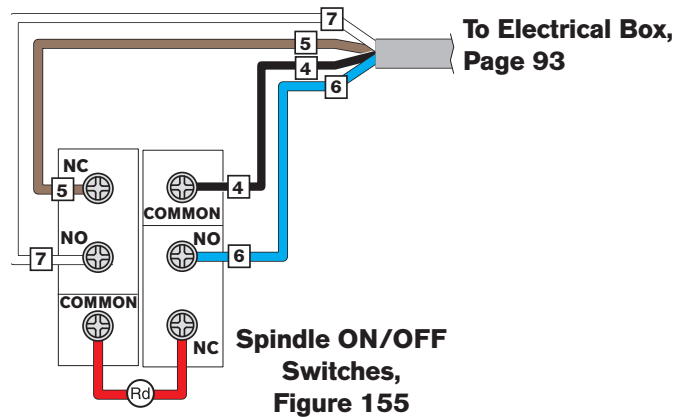
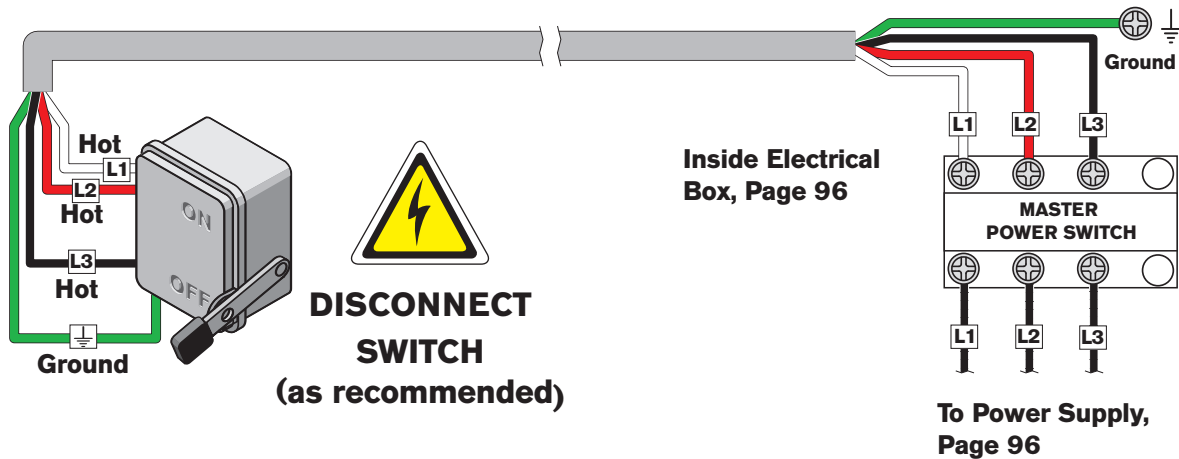


Figure 155. Spindle ON/OFF switches.



# Power Connection



# Additional Component Wiring

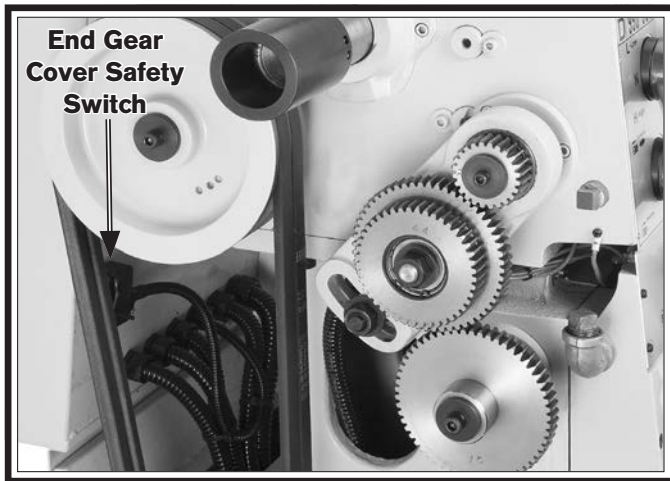


Figure 156. End Gear Cover Safety Switch location.

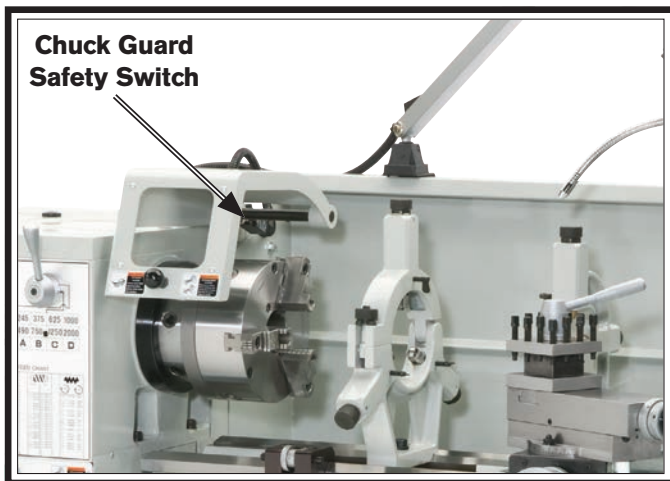
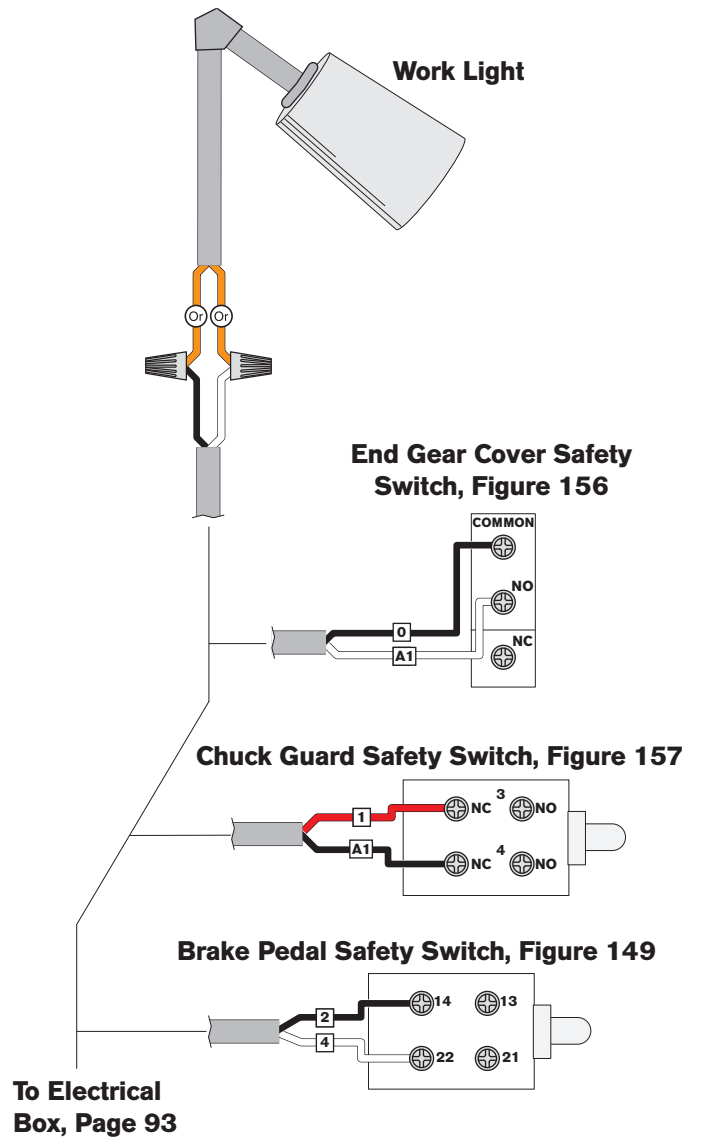
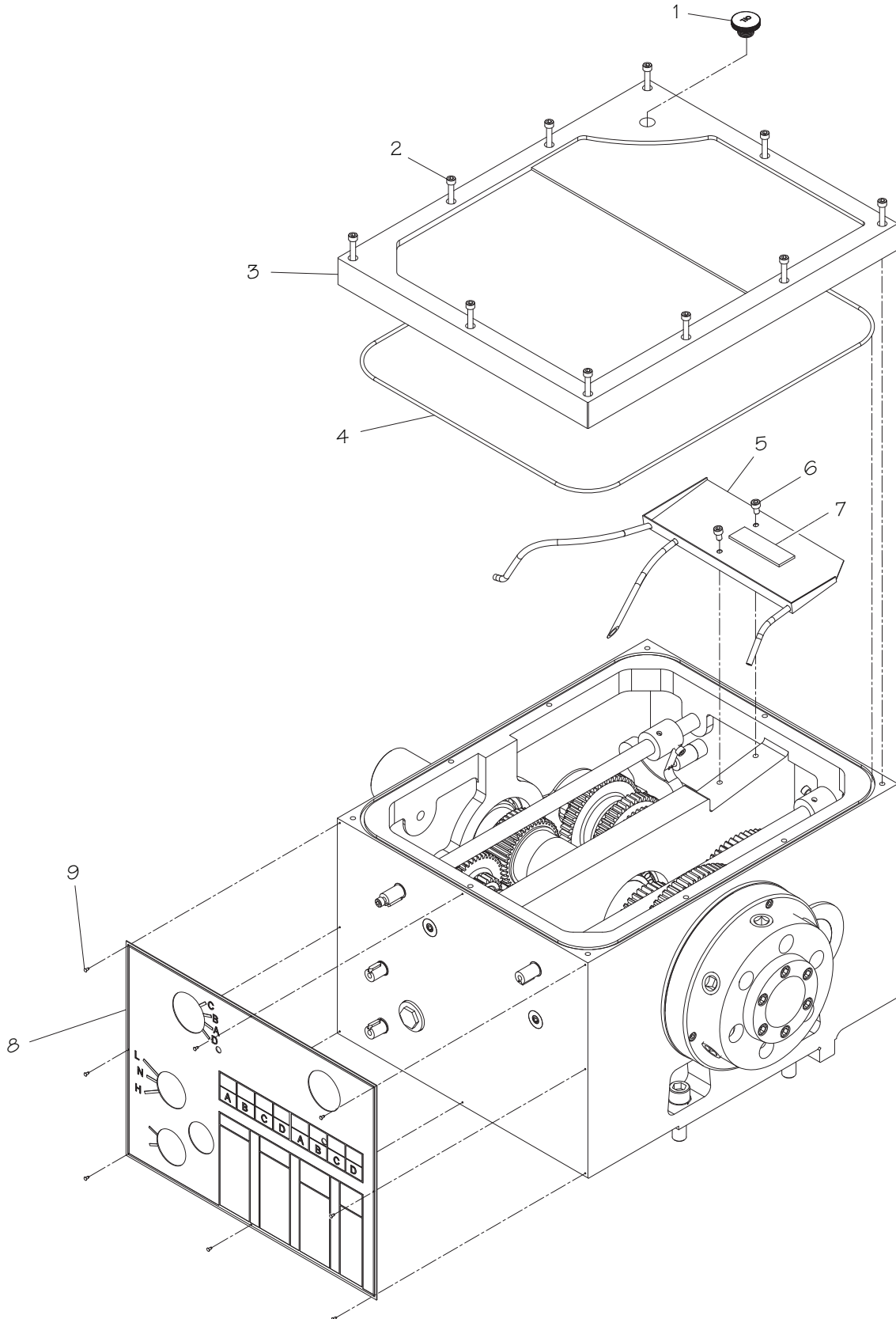


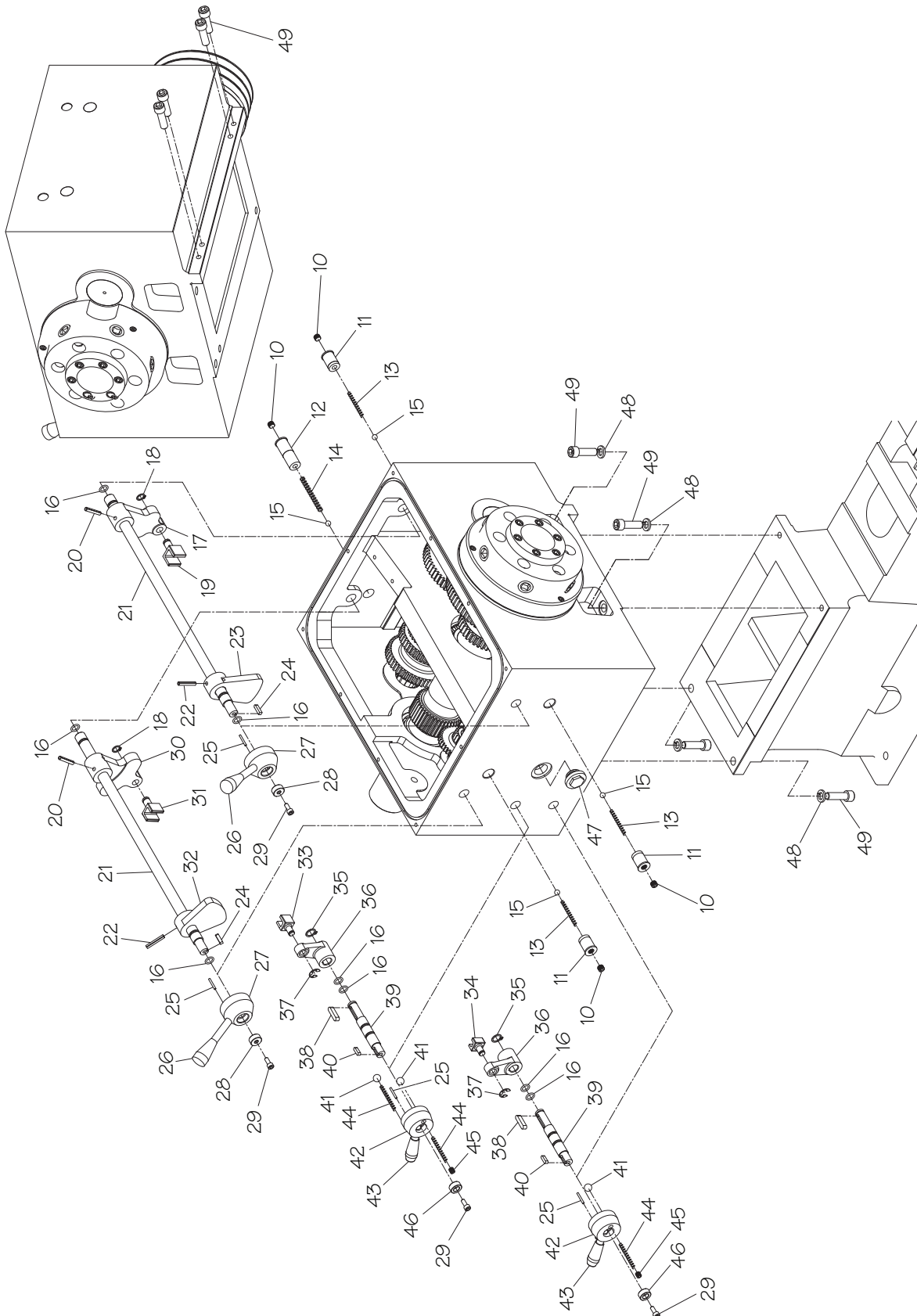
Figure 157. Chuck Guard Safety Switch location.



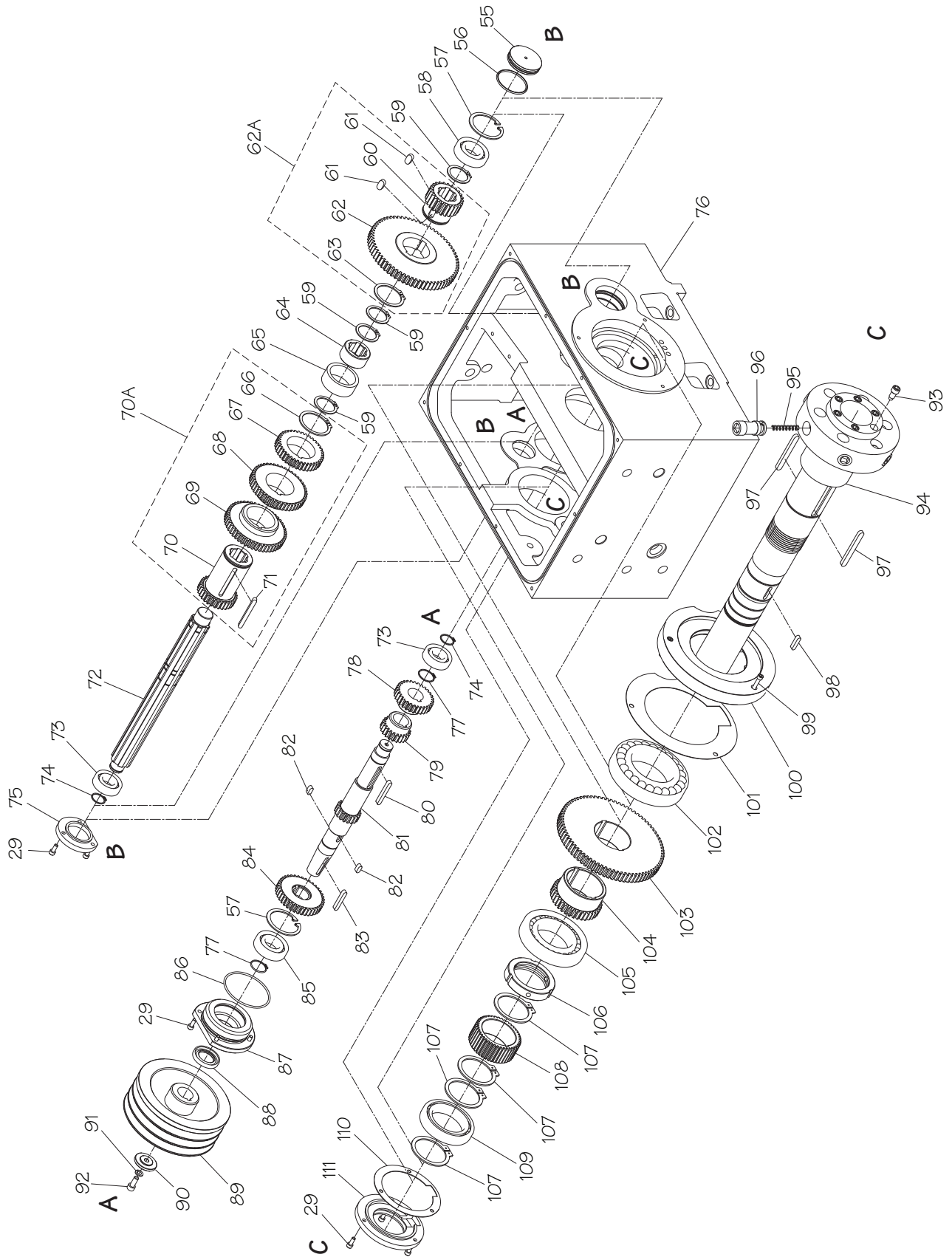
# Headstock 1



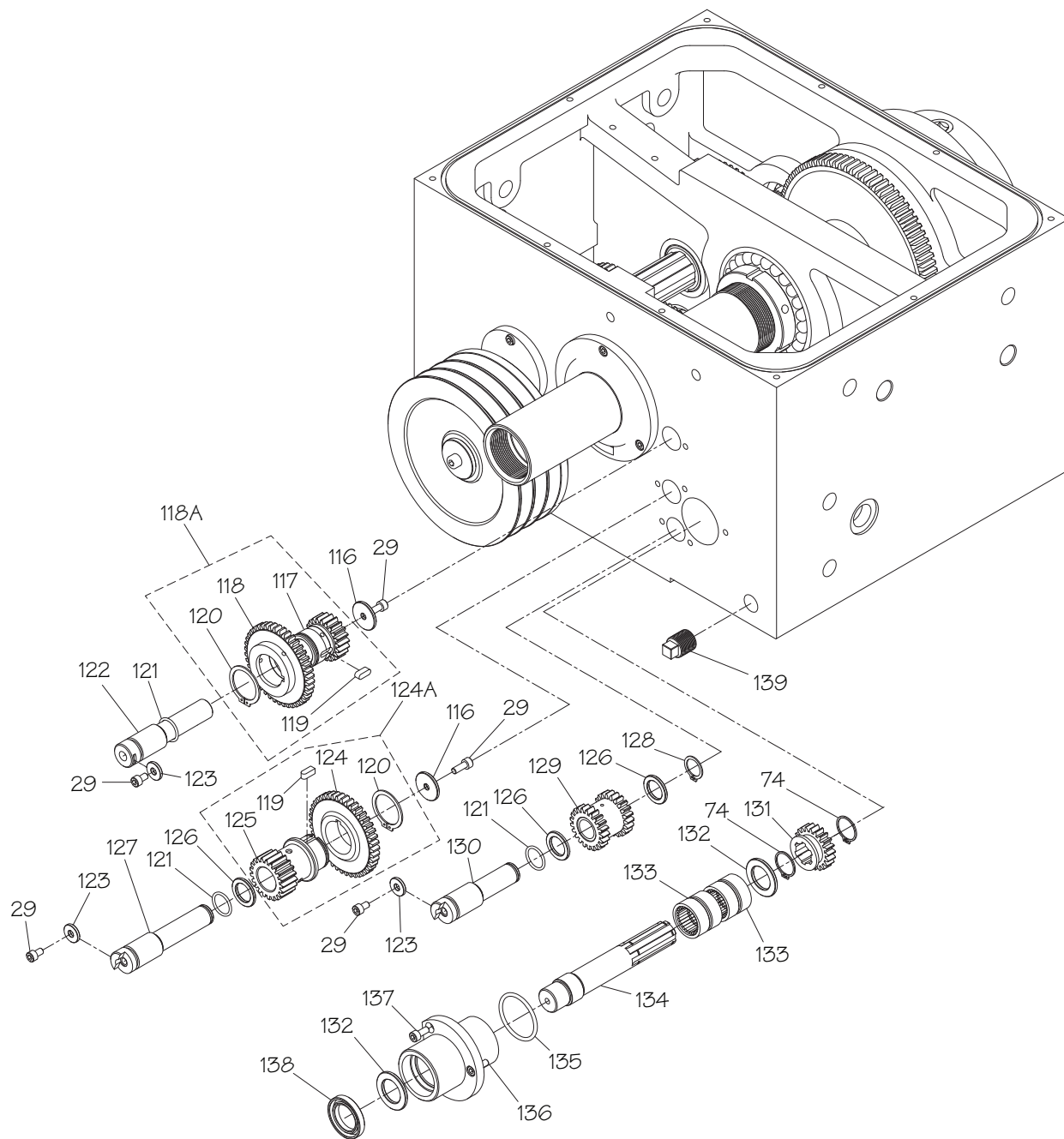
# Headstock 2



# Headstock 3



# Headstock 4





# Headstock Parts List

| REF | PART #      | DESCRIPTION                   |
|-----|-------------|-------------------------------|
| 1   | PSB10530001 | OIL FILL CAP                  |
| 2   | PCAP194M    | CAP SCREW M6-1 X 40 CHROME    |
| 3   | PSB10530003 | HEADSTOCK COVER               |
| 4   | PSB10530004 | HEADSTOCK COVER SEAL          |
| 5   | PSB10530005 | HEADSTOCK CATCH TRAY          |
| 6   | PCAP04M     | CAP SCREW M6-1 X 10           |
| 7   | PSB10530007 | MAGNET                        |
| 8   | PSB10530008 | HEADSTOCK FRONT PANEL         |
| 9   | PRIV001M    | STEEL FLUTED RIVET 2 X 5MM    |
| 10  | PSS30M      | SET SCREW M10-1.5 X 10        |
| 11  | PSB10530011 | THREADED INSERT M10-1.5       |
| 12  | PSB10530012 | THREADED INSERT M10-1.5       |
| 13  | PSB10530013 | COMPRESSION SPRING 8 X 37MM   |
| 14  | PSB10530014 | COMPRESSION SPRING 8 X 52.5MM |
| 15  | PSTB001M    | STEEL BALL 8.5MM              |
| 16  | PORP016     | O-RING 15.8 X 2.4 P16         |
| 17  | PSB10530017 | SHIFT ROCKER ARM              |
| 18  | PRO3M       | EXT RETAINING RING 12MM       |
| 19  | PSB10530019 | SHIFT FORK                    |
| 20  | PRP31M      | ROLL PIN 6 X 36               |
| 21  | PSB10530021 | SHIFT ROD                     |
| 22  | PRP32M      | ROLL PIN 6 X 40               |
| 23  | PSB10530023 | SHIFT ROD BRACKET             |
| 24  | PK01M       | KEY 5 X 5 X 22                |
| 25  | PRP105M     | ROLL PIN 3 X 24               |
| 26  | PSB10530026 | SHIFT LEVER                   |
| 27  | PSB10530027 | SHIFT LEVER HUB               |
| 28  | PSB10530028 | HUB RETAINING WASHER          |
| 29  | PCAP01M     | CAP SCREW M6-1 X 16           |
| 30  | PSB10530030 | SHIFT ROCKER ARM              |
| 31  | PSB10530031 | SHIFT FORK                    |
| 32  | PSB10530032 | SHIFT ROD BRACKET             |
| 33  | PSB10530033 | SHIFT FORK                    |
| 34  | PSB10530034 | SHIFT FORK                    |
| 35  | PRO5M       | EXT RETAINING RING 15MM       |
| 36  | PSB10530036 | SHIFT ROCKER ARM              |
| 37  | PECO15M     | E-CLIP 8MM                    |
| 38  | PK12M       | KEY 5 X 5 X 30                |
| 39  | PSB10530039 | SHIFT ROD                     |
| 40  | PK164M      | KEY 5 X 5 X 17                |
| 41  | PSTB001     | STEEL BALL 1/4                |
| 42  | PSB10530042 | SHIFT HUB                     |
| 43  | PSB10530043 | SHIFT LEVER                   |
| 44  | PSB10530044 | COMPRESSION SPRING 6 X 27.5MM |
| 45  | PSS20M      | SET SCREW M8-1.25 X 8         |
| 46  | PSB10530046 | HUB RETAINING WASHER          |

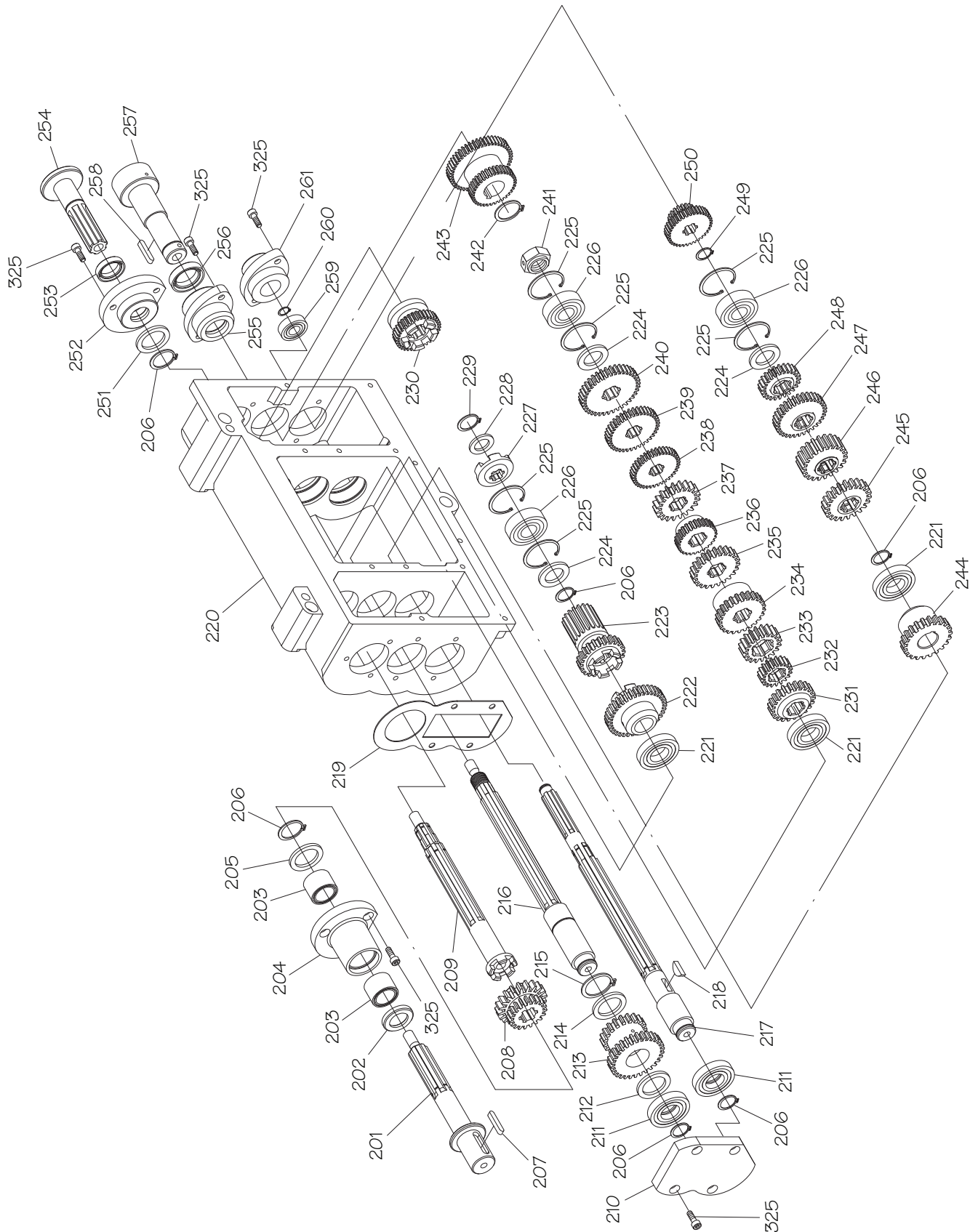
| REF | PART #       | DESCRIPTION                 |
|-----|--------------|-----------------------------|
| 47  | PSB10530047  | OIL SIGHT GLASS 3/4"        |
| 48  | PLW05M       | LOCK WASHER 12MM            |
| 49  | PCAP92M      | CAP SCREW M12-1.75 X 40     |
| 55  | PSB10530055  | HOUSING PLUG                |
| 56  | PORG050      | O-RING 54.4 X 3.1 G50       |
| 57  | PR38M        | INT RETAINING RING 62MM     |
| 58  | P6206-OPEN   | BALL BEARING 6206 OPEN      |
| 59  | PR31M        | EXT RETAINING RING 38MM     |
| 60  | PSB10530062A | GEAR 24T                    |
| 61  | PK175M       | KEY 10 X 6 X 20             |
| 62A | PSB10530062A | GEAR ASSEMBLY 24/67T        |
| 62  | PSB10530062A | GEAR 67T                    |
| 63  | PR76M        | EXT RETAINING RING 52MM     |
| 64  | PSB10530064  | GEAR COLLAR                 |
| 65  | PSB10530065  | BUSHING                     |
| 66  | PR78M        | EXT RETAINING RING 55MM     |
| 67  | PSB10530070A | GEAR 38T                    |
| 68  | PSB10530070A | GEAR 46T                    |
| 69  | PSB10530070A | GEAR 50T                    |
| 70A | PSB10530070A | GEAR ASSEMBLY 38/46/50/30T  |
| 70  | PSB10530070A | GEAR 30T                    |
| 71  | PK176M       | KEY 7 X 7 X 70              |
| 72  | PSB10530072  | DRIVE SHAFT                 |
| 73  | P6205-OPEN   | BALL BEARING 6205 OPEN      |
| 74  | PR11M        | EXT RETAINING RING 25MM     |
| 75  | PSB10530075  | BEARING SEAT                |
| 76  | PSB10530076  | HEADSTOCK HOUSING (SB1053)  |
| 76  | PSB1054F0076 | HEADSTOCK HOUSING (SB1054F) |
| 76  | PSB1054F0076 | HEADSTOCK HOUSING (SB1055F) |
| 77  | PR15M        | EXT RETAINING RING 30MM     |
| 78  | PSB10530078  | GEAR 30T                    |
| 79  | PSB10530079  | GEAR 22T                    |
| 80  | PK66M        | KEY 7 X 7 X 55              |
| 81  | PSB10530081  | GEAR SHAFT 18T              |
| 82  | PK177M       | KEY 7 X 7 X 16              |
| 83  | PK62M        | KEY 7 X 7 X 45              |
| 84  | PSB10530084  | GEAR 38T                    |
| 85  | P6206-2RS    | BALL BEARING 6206-2RS       |
| 86  | PORG085      | O-RING 84.4 X 3.1 G85       |
| 87  | PSB10530087  | FLANGED BEARING             |
| 88  | PSB10530088  | OIL SEAL 305008             |
| 89  | PSB10530089  | SPINDLE PULLEY              |
| 90  | PSB10530090  | PULLEY RETAINING WASHER     |
| 91  | PLW04M       | LOCK WASHER 8MM             |
| 92  | PCAP31M      | CAP SCREW M8-1.25 X 25      |
| 93  | PSB10530093  | SPINDLE NOSE STEP BOLT      |

# Headstock Parts List

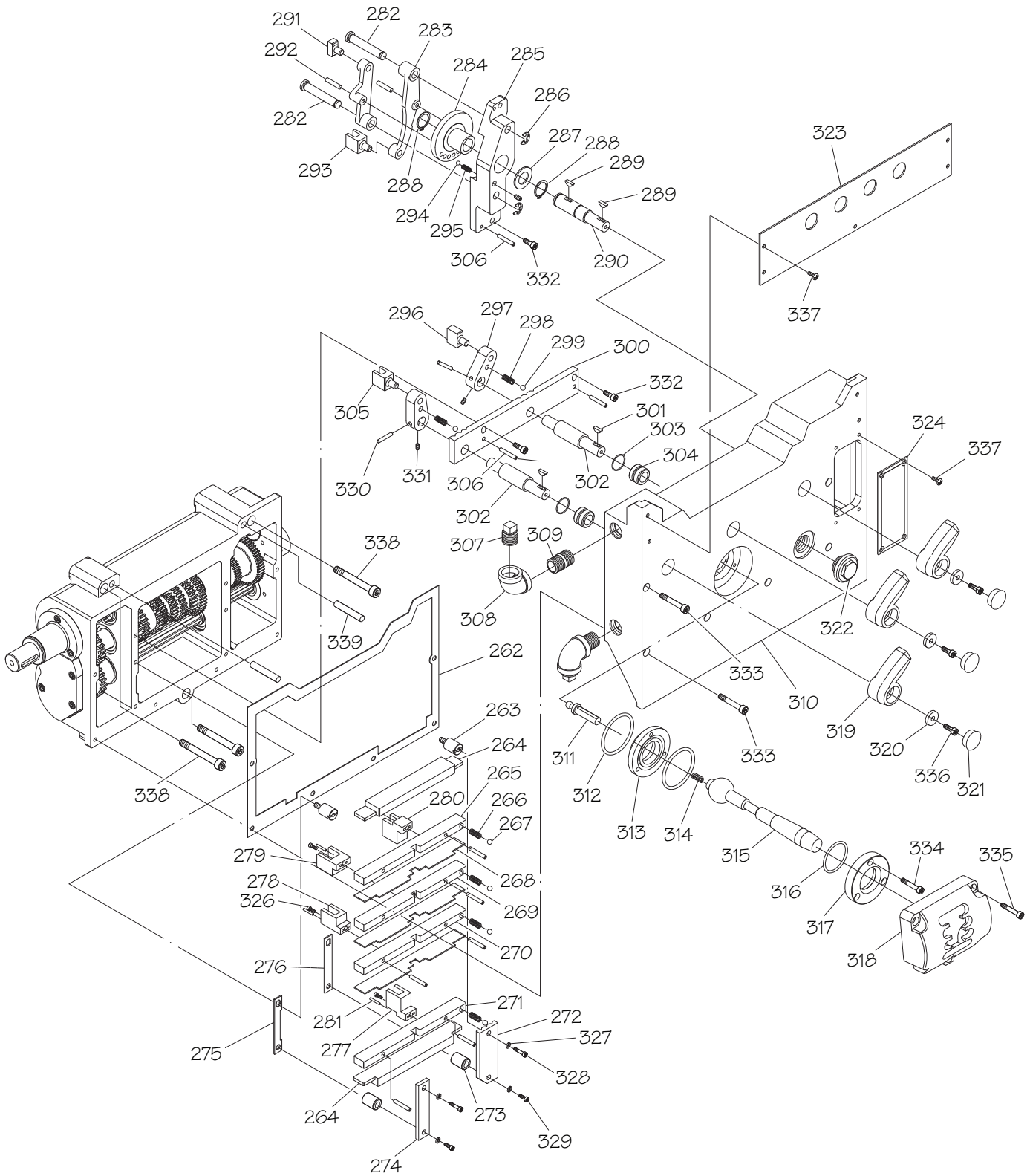
| REF  | PART #       | DESCRIPTION                 |
|------|--------------|-----------------------------|
| 94   | PSB10530094  | SPINDLE D1-6 MT#6           |
| 95   | PSB10530095  | CAMLOCK SPRING              |
| 96   | PSB10530096  | CAMLOCK                     |
| 97   | PK162M       | KEY 10 X 6 X 85             |
| 98   | PK28M        | KEY 7 X 7 X 30              |
| 99   | PCAP48M      | CAP SCREW M6-1 X 35         |
| 100  | PSB10530100  | SPINDLE BEARING FRONT COVER |
| 101  | PSB10530101  | FRONT BEARING COVER GASKET  |
| 102  | P32019-T     | TAPERED BEARING 32019 NTN   |
| 103  | PSB10530103  | GEAR 79T                    |
| 104  | PSB10530104  | GEAR 36T                    |
| 105  | P30214-T     | TAPERED BEARING 30214 NTN   |
| 106  | PSB10530106  | SPANNER NUT YSR70           |
| 107  | PR13M        | EXT RETAINING RING 65MM     |
| 108  | PSB10530108  | GEAR 42T                    |
| 109  | P6013-OPEN   | BALL BEARING 6013 OPEN      |
| 110  | PSB10530110  | REAR SPINDLE COVER GASKET   |
| 111  | PSB10530111  | REAR SPINDLE COVER          |
| 116  | PSB10530116  | GEAR FLAT WASHER            |
| 117  | PSB10530118A | GEAR 21T                    |
| 118A | PSB10530118A | GEAR ASSEMBLY 21/42T        |
| 118  | PSB10530118A | GEAR 42T                    |

| REF  | PART #       | DESCRIPTION             |
|------|--------------|-------------------------|
| 119  | PK144M       | KEY 6 X 6 X 16          |
| 120  | PR12M        | EXT RETAINING RING 35MM |
| 121  | PORP021      | O-RING 20.8 X 2.4 P21   |
| 122  | PSB10530122  | GEAR SHAFT              |
| 123  | PSB10530123  | SHAFT FLAT WASHER       |
| 124A | PSB10530124A | GEAR ASSEMBLY 21/42T    |
| 124  | PSB10530124A | GEAR 42T                |
| 125  | PSB10530124A | GEAR 21T                |
| 126  | PSB10530126  | THRUST WASHER           |
| 127  | PSB10530127  | GEAR SHAFT              |
| 128  | PRO9M        | EXT RETAINING RING 20MM |
| 129  | PSB10530129  | GEAR 21T                |
| 130  | PSB10530130  | GEAR SHAFT              |
| 131  | PSB10530131  | GEAR 21T                |
| 132  | PSB10530132  | THRUST WASHER           |
| 133  | PSB10530133  | NEEDLE BEARING RNA 6904 |
| 134  | PSB10530134  | GEAR SHAFT              |
| 135  | PORP044      | O-RING 43.7 X 3.5 P44   |
| 136  | PSB10530136  | FLANGED BEARING         |
| 137  | PCAP26M      | CAP SCREW M6-1 X 12     |
| 138  | PSB10530138  | OIL SEAL 28 X 44 X 7MM  |
| 139  | PSB10530139  | OIL PLUG 1/2" NPT       |

# Gearbox 1



# Gearbox 2



# Gearbox Parts List

| REF | PART #      | DESCRIPTION               |
|-----|-------------|---------------------------|
| 201 | PSB10530201 | GEAR SHAFT                |
| 202 | PSB10530202 | OIL SEAL 20 X 32 X 5MM    |
| 203 | PSB10530203 | NEEDLE BEARING TAF 202820 |
| 204 | PSB10530204 | FLANGED BEARING           |
| 205 | PSB10530205 | THRUST WASHER             |
| 206 | PRO9M       | EXT RETAINING RING 20MM   |
| 207 | PK109M      | KEY 7 X 7 X 35            |
| 208 | PSB10530208 | GEAR 19/20T               |
| 209 | PSB10530209 | GEAR SHAFT                |
| 210 | PSB10530210 | END GEAR COVER            |
| 211 | P16004      | BALL BEARING 16004-OPEN   |
| 212 | PSB10530212 | THRUST WASHER             |
| 213 | PSB10530213 | GEAR 19/30T               |
| 214 | PSB10530214 | THRUST WASHER             |
| 215 | PR11M       | EXT RETAINING RING 25MM   |
| 216 | PSB10530216 | GEAR SHAFT                |
| 217 | PSB10530217 | GEAR SHAFT                |
| 218 | PSB10530218 | WOODRUFF KEY 5 X 19       |
| 219 | PSB10530219 | END GEAR COVER GASKET     |
| 220 | PSB10530220 | GEARBOX HOUSING           |
| 221 | P16004      | BALL BEARING 16004-OPEN   |
| 222 | PSB10530222 | GEAR 38T                  |
| 223 | PSB10530223 | GEAR 23/19T               |
| 224 | PSB10530224 | THRUST WASHER             |
| 225 | PR23M       | INT RETAINING RING 40MM   |
| 226 | P6203-OPEN  | BALL BEARING 6203 OPEN    |
| 227 | PSB10530227 | CLUTCH                    |
| 228 | PSB10530228 | THRUST WASHER             |
| 229 | PRO6M       | EXT RETAINING RING 16MM   |
| 230 | PSB10530230 | GEAR 35T                  |
| 231 | PSB10530231 | GEAR 22T                  |
| 232 | PSB10530232 | GEAR 19T                  |
| 233 | PSB10530233 | GEAR 20T                  |
| 234 | PSB10530234 | GEAR 24T                  |
| 235 | PSB10530235 | GEAR 23T                  |
| 236 | PSB10530236 | GEAR 27T                  |
| 237 | PSB10530237 | GEAR 24T                  |
| 238 | PSB10530238 | GEAR 28T                  |
| 239 | PSB10530239 | GEAR 26T                  |
| 240 | PSB10530240 | GEAR 38T                  |
| 241 | PSB10530241 | LOCK COLLAR               |
| 242 | PR10M       | EXT RETAINING RING 22MM   |
| 243 | PSB10530243 | GEAR 36/50T               |
| 244 | PSB10530244 | GEAR 22T                  |
| 245 | PSB10530245 | GEAR 22T                  |
| 246 | PSB10530246 | GEAR 22T                  |

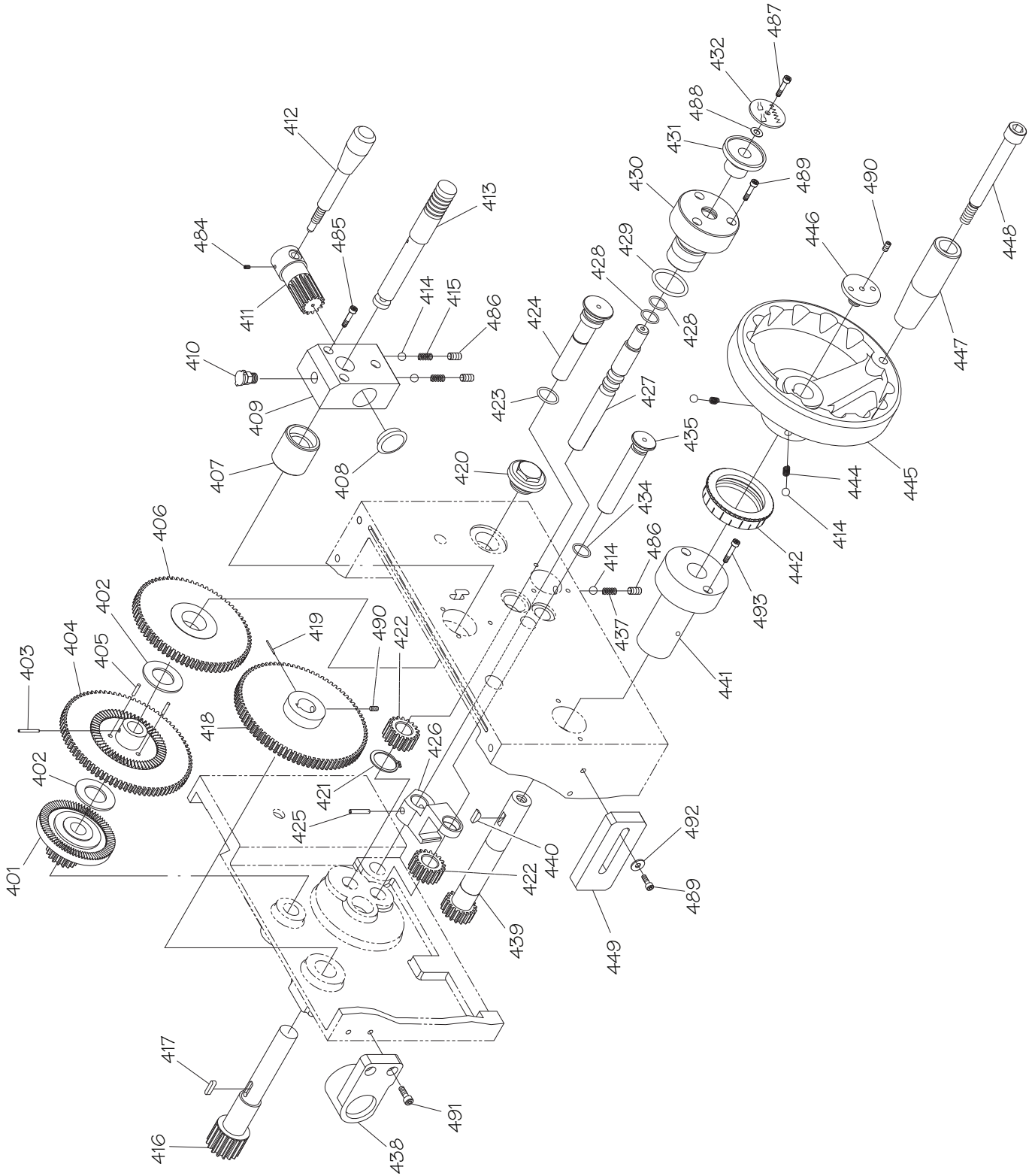
| REF | PART #      | DESCRIPTION                |
|-----|-------------|----------------------------|
| 247 | PSB10530247 | GEAR 33T                   |
| 248 | PSB10530248 | GEAR 22T                   |
| 249 | PR18M       | EXT RETAINING RING 17MM    |
| 250 | PSB10530250 | GEAR 20/36T                |
| 251 | PSB10530251 | THRUST WASHER              |
| 252 | PSB10530252 | FLANGED BEARING            |
| 253 | PSB10530253 | OIL SEAL 20 X 32 X 5MM     |
| 254 | PSB10530254 | GEAR SHAFT                 |
| 255 | PSB10530255 | FLANGED BEARING            |
| 256 | PSB10530256 | OIL SEAL 24 X 35 X 8MM     |
| 257 | PSB10530257 | SHAFT                      |
| 258 | PK15M       | KEY 5 X 5 X 35             |
| 259 | P6001-OPEN  | BALL BEARING 6001 OPEN     |
| 260 | PRO3M       | EXT RETAINING RING 12MM    |
| 261 | PSB10530261 | FLANGED BEARING            |
| 262 | PSB10530262 | GEARBOX HOUSING GASKET     |
| 263 | PSB10530263 | SHIFT SUPPORT STEP BOLT    |
| 264 | PSB10530264 | SHIFT PLATE                |
| 265 | PSB10530265 | UPPER SHIFT SUPPORT        |
| 266 | PSB10530266 | COMPRESSION SPRING 4 X 19  |
| 267 | PSTB001     | STEEL BALL 1/4             |
| 268 | PSB10530268 | SHIFT SUPPORT PARTITION    |
| 269 | PSB10530269 | UPPER MIDDLE SHIFT SUPPORT |
| 270 | PSB10530270 | LOWER MIDDLE SHIFT SUPPORT |
| 271 | PSB10530271 | LOWER SHIFT SUPPORT        |
| 272 | PSB10530272 | REVERSE/STOP PLATE         |
| 273 | PSB10530273 | SPACER                     |
| 274 | PSB10530274 | SHOULDER PLATE             |
| 275 | PSB10530275 | INDENTED CONNECTING PLATE  |
| 276 | PSB10530276 | CONNECTING PLATE           |
| 277 | PSB10530277 | SHIFT FORK                 |
| 278 | PSB10530278 | LOWER MIDDLE SHIFT FORK    |
| 279 | PSB10530279 | UPPER MIDDLE SHIFT FORK    |
| 280 | PSB10530277 | SHIFT FORK                 |
| 281 | PRP02M      | ROLL PIN 3 X 16            |
| 282 | PSB10530282 | CAPTIVE PIN                |
| 283 | PSB10530283 | ROCKER ARM                 |
| 284 | PSB10530284 | CAM                        |
| 285 | PSB10530285 | CAM BRACKET                |
| 286 | PECO15M     | E-CLIP 8MM                 |
| 287 | PSB10530287 | THRUST WASHER              |
| 288 | PR18M       | EXT RETAINING RING 17MM    |
| 289 | PSB10530289 | WOODRUFF KEY 4 X 13        |
| 290 | PSB10530290 | SHAFT                      |
| 291 | PSB10530291 | SHIFT TAB                  |
| 292 | PSB10530292 | DOWEL PIN 5MM              |

# Gearbox Parts List

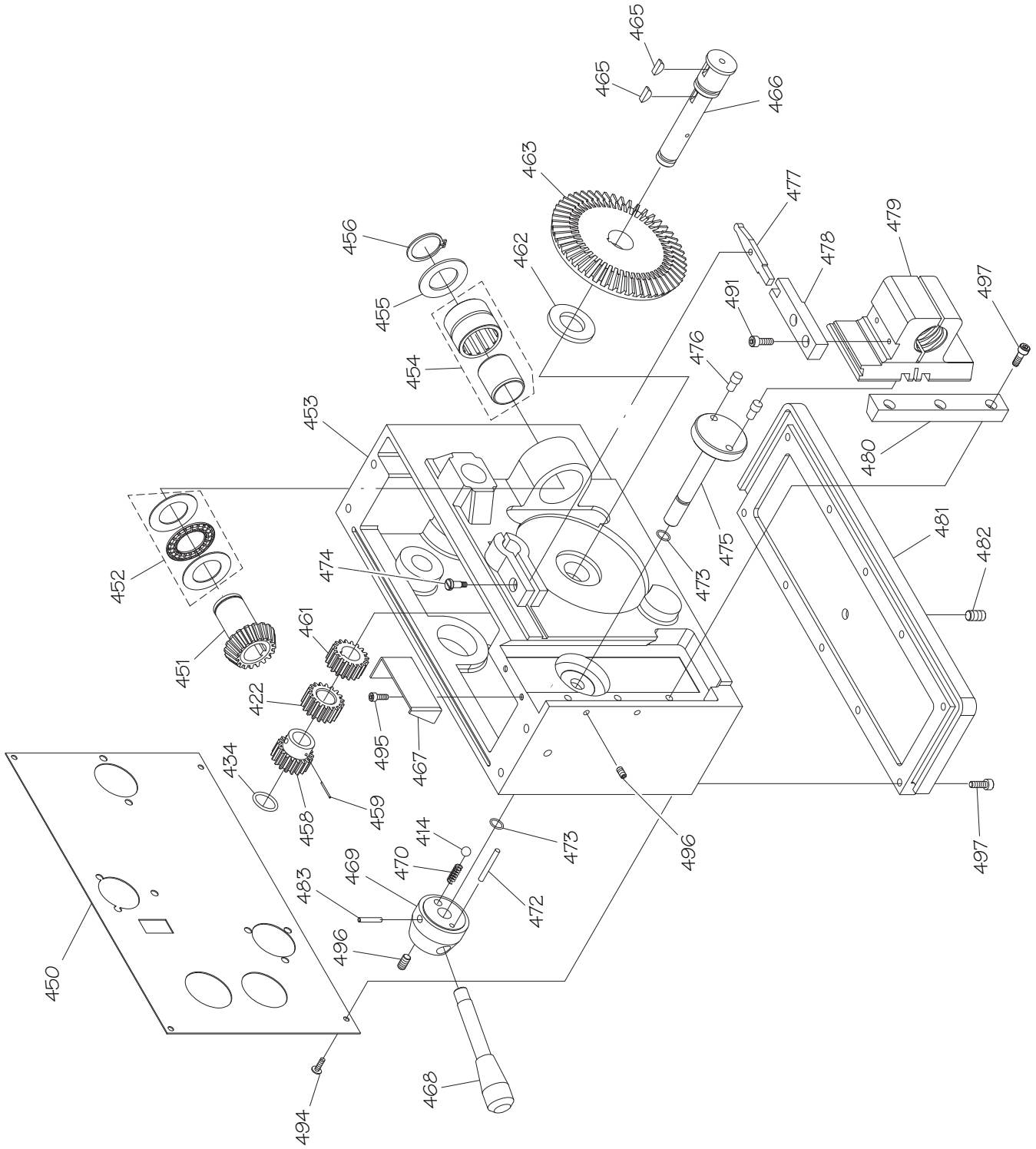
| REF | PART #      | DESCRIPTION                  |
|-----|-------------|------------------------------|
| 293 | PSB10530293 | SHIFT FORK                   |
| 294 | PSTB001     | STEEL BALL 1/4               |
| 295 | PSB10530295 | COMPRESSION SPRING 6.35 X 18 |
| 296 | PSB10530296 | SHIFT TAB                    |
| 297 | PSB10530297 | PIVOT ARM                    |
| 298 | PSB10530298 | COMPRESSION SPRING 6 X 13    |
| 299 | PSTB001     | STEEL BALL 1/4               |
| 300 | PSB10530300 | SELECTOR BAR                 |
| 301 | PSB10530289 | WOODRUFF KEY 4 X 13          |
| 302 | PSB10530302 | SELECTOR SHAFT               |
| 303 | PORP018     | O-RING 17.8 X 2.4 P18        |
| 304 | PSB10530304 | BUSHING                      |
| 305 | PSB10530305 | SHIFT FORK                   |
| 306 | PRP24M      | ROLL PIN 5 X 16              |
| 307 | PSB10530139 | OIL PLUG 1/2" NPT            |
| 308 | PSB10530308 | PIPE ELBOW 1/2" NPT          |
| 309 | PSB10530309 | PIPE NIPPLE 1/2" X 1" NPT    |
| 310 | PSB10530310 | GEARBOX FRONT COVER          |
| 311 | PSB10530311 | SELECTOR PIN                 |
| 312 | PORG040     | O-RING 39.4 X 3.1 G40        |
| 313 | PSB10530313 | SHIFT ROD BRACKET            |
| 314 | PSB10530314 | COMPRESSION SPRING 9 X 38    |
| 315 | PSB10530315 | SHIFT ROD                    |
| 316 | PORG030     | O-RING 3.1 X 29.4 G30        |

| REF | PART #      | DESCRIPTION            |
|-----|-------------|------------------------|
| 317 | PSB10530317 | END CAP                |
| 318 | PSB10530318 | SHIFT ROD PLATE        |
| 319 | PSB10530319 | SHIFT LEVER            |
| 320 | PSB10530320 | LEVER FLAT WASHER      |
| 321 | PSB10530321 | LEVER END PLUG         |
| 322 | PSB10530047 | OIL SIGHT GLASS 3/4"   |
| 323 | PSB10530323 | SHIFT LEVER PLATE      |
| 324 | PSB10530324 | COVER PLATE            |
| 325 | PCAP26M     | CAP SCREW M6-1 X 12    |
| 326 | PCAP15M     | CAP SCREW M5-.8 X 20   |
| 327 | PLW03M      | LOCK WASHER 6MM        |
| 328 | PCAP26M     | CAP SCREW M6-1 X 12    |
| 329 | PCAP48M     | CAP SCREW M6-1 X 35    |
| 330 | PRP04M      | ROLL PIN 4 X 24        |
| 331 | PS503M      | SET SCREW M6-1 X 8     |
| 332 | PCAP02M     | CAP SCREW M6-1 X 20    |
| 333 | PCAP167M    | CAP SCREW M6-1 X 70    |
| 334 | PCAP38M     | CAP SCREW M5-.8 X 25   |
| 335 | PCAP26M     | CAP SCREW M6-1 X 12    |
| 336 | PCAP33M     | CAP SCREW M5-.8 X 12   |
| 337 | PS17M       | PHLP HD SCR M4-.7 X 6  |
| 338 | PCAP66M     | CAP SCREW M8-1.25 X 65 |
| 339 | PSB10530339 | TAPER PIN #7 X 3-1/2   |

# Apron 1



# Apron 2



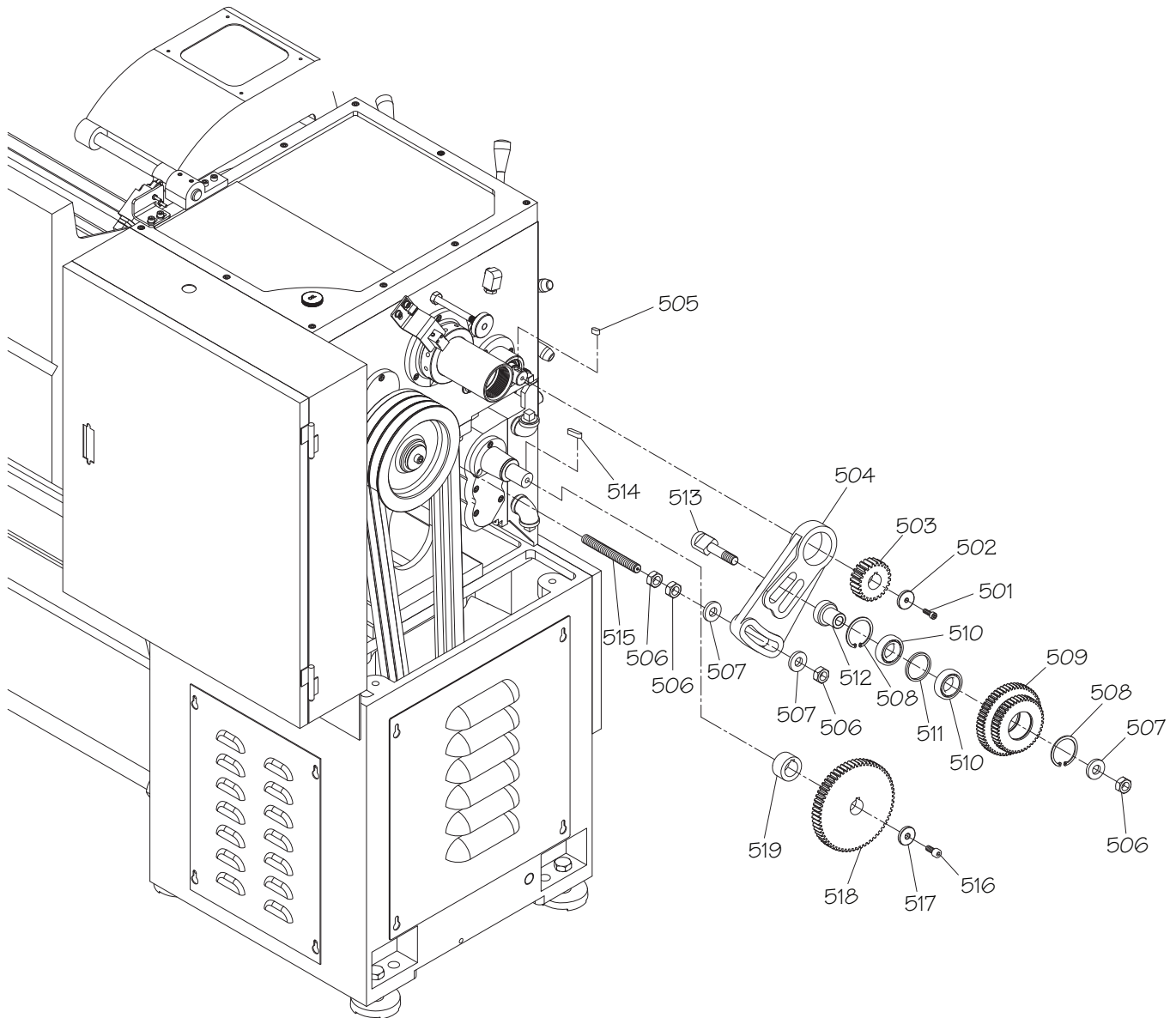


# Apron Parts List

| REF | PART #      | DESCRIPTION                |
|-----|-------------|----------------------------|
| 401 | PSB10530401 | GEAR 18/60T                |
| 402 | PSB10530402 | THRUST BEARING AS3047      |
| 403 | PRP20M      | ROLL PIN 4 X 22            |
| 404 | PSB10530404 | GEAR 81/60T                |
| 405 | PSB10530405 | DOWEL PIN 4 X 17           |
| 406 | PSB10530406 | GEAR 72/60T                |
| 407 | PSB10530407 | BUSHING                    |
| 408 | PSB10530408 | HOUSING PLUG               |
| 409 | PSB10530409 | GEAR HOUSING               |
| 410 | PSB10530410 | OIL CAP                    |
| 411 | PSB10530411 | BULL GEAR SHAFT            |
| 412 | PSB10530412 | HALF NUT LEVER             |
| 413 | PSB10530413 | PINION                     |
| 414 | PSTB001     | STEEL BALL 1/4             |
| 415 | PSB10530298 | COMPRESSION SPRING 6 X 13  |
| 416 | PSB10530416 | GEAR SHAFT 16T             |
| 417 | PK14M       | KEY 5 X 5 X 18             |
| 418 | PSB10530418 | GEAR 81T                   |
| 419 | PRP10M      | ROLL PIN 5 X 36            |
| 420 | PSB10530047 | OIL SIGHT GLASS 3/4"       |
| 421 | PRO6M       | EXT RETAINING RING 16MM    |
| 422 | PSB10530422 | GEAR 18T                   |
| 423 | PORP018     | O-RING 17.8 X 2.4 P18      |
| 424 | PSB10530424 | GEAR SHAFT                 |
| 425 | PRPO4M      | ROLL PIN 4 X 24            |
| 426 | PSB10530426 | FEED SELECTION FORK        |
| 427 | PSB10530427 | FEED SELECTION SHAFT       |
| 428 | PORP016     | O-RING 15.8 X 2.4 P16      |
| 429 | PORP026     | O-RING 25.7 X 3.5 P26      |
| 430 | PSB10530430 | KNOB HUB                   |
| 431 | PSB10530431 | FEED SELECTION KNOB        |
| 432 | PSB10530432 | FEED SELECTION PLATE       |
| 434 | PORP012     | O-RING 11.8 X 2.4 P12      |
| 435 | PSB10530435 | GEAR SHAFT                 |
| 437 | PSB10530437 | COMPRESSION SPRING 4 X 19  |
| 438 | PSB10530438 | LEADSCREW BRACKET          |
| 439 | PSB10530439 | GEAR SHAFT 18T             |
| 440 | PSB10530218 | WOODRUFF KEY 5 X 19        |
| 441 | PSB10530441 | HANDWHEEL HUB              |
| 442 | PSB10530442 | CARRIAGE GRADUATED DIAL    |
| 444 | PSB10530444 | COMPRESSION SPRING         |
| 445 | PSB10530445 | CARRIAGE HANDWHEEL         |
| 446 | PSB10530446 | HANDWHEEL END PLATE        |
| 447 | PSB10530447 | HANDWHEEL HANDLE           |
| 448 | PSB10530448 | HANDWHEEL HANDLE CAP SCREW |

| REF | PART #      | DESCRIPTION                |
|-----|-------------|----------------------------|
| 449 | PSB10530449 | CARRIAGE STOP PLATE        |
| 450 | PSB10530450 | FRONT APRON PANEL          |
| 451 | PSB10530451 | BEVEL GEAR 23T             |
| 452 | PSB10530452 | THRUST BEARING NTB/AS-2542 |
| 453 | PSB10530453 | APRON HOUSING              |
| 454 | PSB10530454 | NEEDLE BEARING NK29/30     |
| 455 | PSB10530455 | THRUST WASHER              |
| 456 | PR11M       | EXT RETAINING RING 25MM    |
| 458 | PSB10530458 | GEAR 18T                   |
| 459 | PRP88M      | ROLL PIN 5 X 22            |
| 461 | PSB10530461 | GEAR 18T                   |
| 462 | PSB10530462 | THRUST WASHER              |
| 463 | PSB10530463 | BEVEL GEAR 64T             |
| 465 | PSB10530289 | WOODRUFF KEY 4 X 13        |
| 466 | PSB10530466 | GEAR SHAFT                 |
| 467 | PSB10530467 | OIL FENCE                  |
| 468 | PSB10530468 | FEED DIRECTION LEVER       |
| 469 | PSB10530469 | FEED DIRECTION LEVER HUB   |
| 470 | PSB10530470 | COMPRESSION SPRING 6 X 27  |
| 472 | PRPO4M      | ROLL PIN 4 X 24            |
| 473 | PORP020     | O-RING 19.8 X 2.4 P20      |
| 474 | PSB10530474 | CLAMP STEP SCREW           |
| 475 | PSB10530475 | HALF NUT SHAFT             |
| 476 | PSB10530476 | SHAFT STEP PIN             |
| 477 | PSB10530477 | PIVOT ARM                  |
| 478 | PSB10530478 | PIVOT BRACKET              |
| 479 | PSB10530479 | HALF NUT                   |
| 480 | PSB10530480 | HALF NUT GIB               |
| 481 | PSB10530481 | BOTTOM APRON COVER         |
| 482 | PSB10530482 | OIL DRAIN PLUG 1/8"        |
| 483 | PRP102M     | ROLL PIN 4 X 36            |
| 484 | PSS02M      | SET SCREW M6-1 X 6         |
| 485 | PCAP79M     | CAP SCREW M5-.8 X 35       |
| 486 | PSS20M      | SET SCREW M8-1.25 X 8      |
| 487 | PS08M       | PHLP HD SCR M5-.8 X 12     |
| 488 | PW03M       | FLAT WASHER 6MM            |
| 489 | PCAP38M     | CAP SCREW M5-.8 X 25       |
| 490 | PSS12M      | SET SCREW M6-1 X 25        |
| 491 | PCAP194M    | CAP SCREW M6-1 X 16 CHROME |
| 492 | PW03M       | FLAT WASHER 6MM            |
| 493 | PCAP38M     | CAP SCREW M5-.8 X 25       |
| 494 | PS17M       | PHLP HD SCR M4-.7 X 6      |
| 495 | PCAP03M     | CAP SCREW M5-.8 X 8        |
| 496 | PSS02M      | SET SCREW M6-1 X 6         |
| 497 | PCAP24M     | CAP SCREW M5-.8 X 16       |

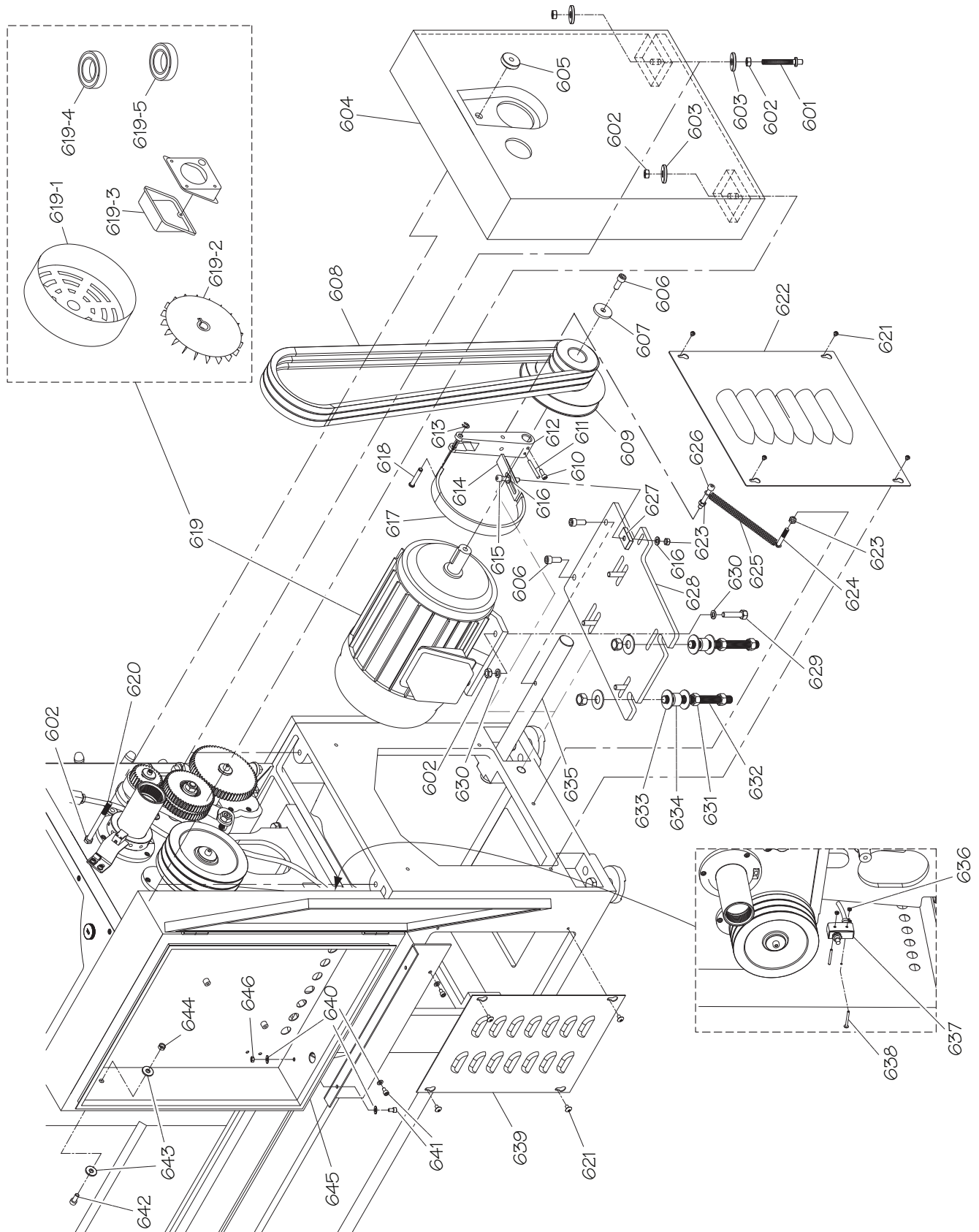
# End Gears



| REF | PART #      | DESCRIPTION             |
|-----|-------------|-------------------------|
| 501 | PCAP02M     | CAP SCREW M6-1 X 20     |
| 502 | PSB10530502 | GEAR FLAT WASHER        |
| 503 | PSB10530503 | GEAR 24T                |
| 504 | PSB10530504 | PIVOT ARM               |
| 505 | PK166M      | KEY 7 X 7 X 15          |
| 506 | PN32M       | HEX NUT M14-2           |
| 507 | PSB10530507 | GEAR FLAT WASHER        |
| 508 | PR25M       | INT RETAINING RING 47MM |
| 509 | PSB10530509 | GEAR 44/56T             |
| 510 | P6005ZZ     | BALL BEARING 6005ZZ     |

| REF | PART #      | DESCRIPTION            |
|-----|-------------|------------------------|
| 511 | PSB10530511 | THRUST WASHER          |
| 512 | PSB10530512 | SHAFT COLLAR           |
| 513 | PSB10530513 | GEAR SHAFT             |
| 514 | PK28M       | KEY 7 X 7 X 30         |
| 515 | PSB10530515 | STUD-FT M14-2 X 120    |
| 516 | PCAP14M     | CAP SCREW M8-1.25 X 20 |
| 517 | PSB10530517 | GEAR FLAT WASHER       |
| 518 | PSB10530518 | GEAR 57T               |
| 519 | PSB10530519 | BUSHING                |

# Spindle Motor Assembly

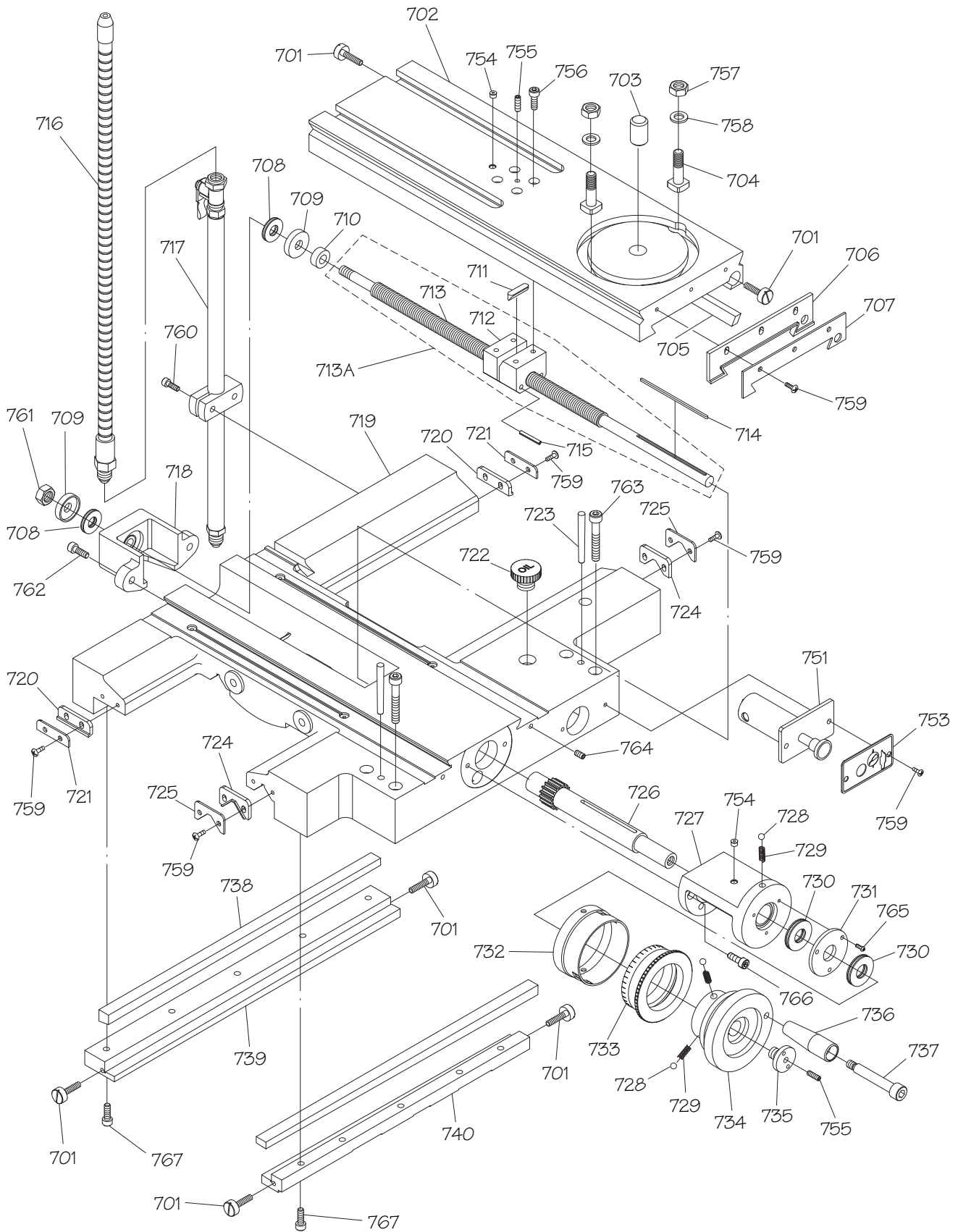


# Spindle Motor Assembly Parts List

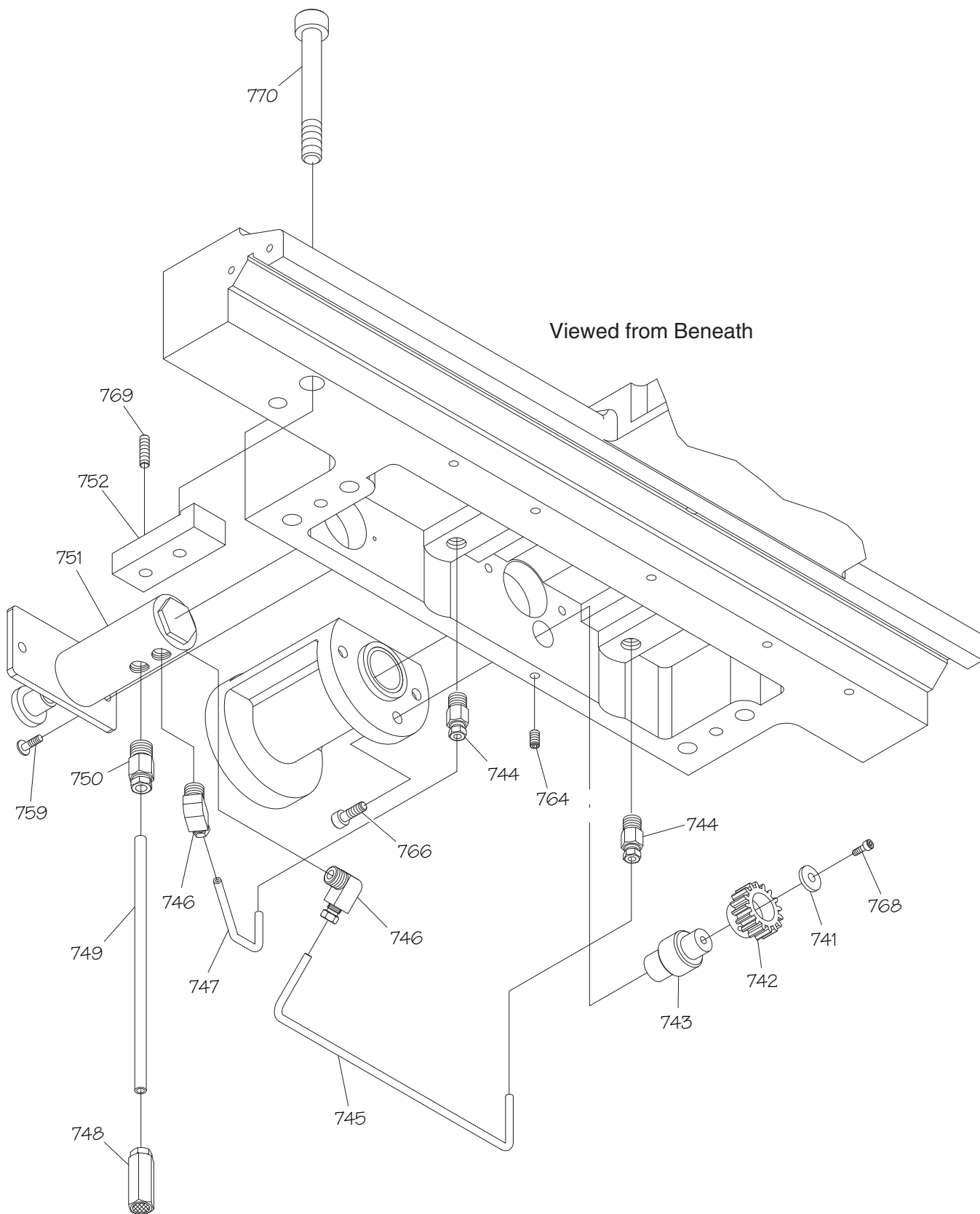
| REF   | PART #         | DESCRIPTION                        |
|-------|----------------|------------------------------------|
| 601   | PSB10530601    | END GEAR COVER ALIGNMENT PIN       |
| 602   | PNO2M          | HEX NUT M10-1.5                    |
| 603   | PWO4M          | FLAT WASHER 10MM                   |
| 604   | PSB10530604    | END GEAR COVER                     |
| 605   | PSB10530605    | KNURLED END GEAR COVER NUT         |
| 606   | PCAP64M        | CAP SCREW M10-1.5 X 25             |
| 607   | PSB10530607    | PULLEY FLAT WASHER                 |
| 608   | PVB69          | V-BELT B69                         |
| 609   | PSB10530609    | MOTOR PULLEY/BRAKE DRUM            |
| 610   | PCAP01M        | CAP SCREW M6-1 X 16                |
| 611   | PSB10530611    | TAPER PIN #4 X 1-3/4"              |
| 612   | PSB10530612    | BRAKE PIVOT ARM                    |
| 613   | PECO9M         | E-CLIP 6MM                         |
| 614   | PSB10530614    | BRAKE ADJUSTMENT PLATE             |
| 615   | PCAP45M        | CAP SCREW M8-1.25 X 45             |
| 616   | PWO1M          | FLAT WASHER 8MM                    |
| 617   | PSB10530617    | BRAKE BELT                         |
| 618   | PSB10530618    | PIVOT ARM CAPTIVE PIN              |
| 619   | PSB10530619    | MOTOR 7.5HP 220V 3PH (SB1053)      |
| 619   | PSB1054F0619   | MOTOR 7.5HP 440V 3PH (SB1054F-55F) |
| 619-1 | PSB10530619-1  | MOTOR FAN COVER (SB1053)           |
| 619-1 | PSB1054F0619-1 | MOTOR FAN COVER (SB1054F-55F)      |
| 619-2 | PSB10530619-2  | MOTOR FAN (SB1053)                 |
| 619-2 | PSB1054F0619-2 | MOTOR FAN (SB1054F-55F)            |
| 619-3 | PSB10530619-3  | JUNCTION BOX (SB1053)              |
| 619-3 | PSB1054F0619-3 | JUNCTION BOX (SB1054F-55F)         |
| 619-4 | PSB10530619-4  | FRONT MOTOR BEARING (SB1053)       |
| 619-4 | PSB1054F0619-4 | FRONT MOTOR BEARING (SB1054F-55F)  |
| 619-5 | PSB10530619-5  | REAR MOTOR BEARING (SB10530)       |

| REF   | PART #         | DESCRIPTION                        |
|-------|----------------|------------------------------------|
| 619-5 | PSB1054F0619-5 | REAR MOTOR BEARING (SB1054F-55F)   |
| 620   | PSB10530620    | END GEAR COVER BOLT                |
| 621   | PS68M          | PHLP HD SCR M6-1 X 10              |
| 622   | PSB10530622    | SIDE MOTOR ACCESS PANEL            |
| 623   | PNO3M          | HEX NUT M8-1.25                    |
| 624   | PSB10530624    | SPRING BOLT                        |
| 625   | PSB10530625    | EXTENSION SPRING                   |
| 626   | PCAP60M        | CAP SCREW M8-1.25 X 55             |
| 627   | PSB10530627    | BRAKE MOUNT SPACER                 |
| 628   | PSB10530628    | MOTOR MOUNT PLATE                  |
| 629   | PB180M         | HEX BOLT M10-1.5 X 40 BLK          |
| 630   | PLW06M         | LOCK WASHER 10MM                   |
| 631   | PNI3M          | HEX NUT M16-2                      |
| 632   | PSB10530632    | STUD-FT M16-2 X 170                |
| 633   | PWO8M          | FLAT WASHER 16MM                   |
| 634   | PSB10530634    | CUSHION SPACER RUBBER              |
| 635   | PSB10530635    | MOTOR MOUNT SHAFT                  |
| 636   | PNO4M          | HEX NUT M4-.7                      |
| 637   | PSB10530637    | END GEAR COVER LIMIT SWITCH TM1307 |
| 638   | PS65M          | PHLP HD SCR M4-.7 X 40             |
| 639   | PSB10530639    | REAR MOTOR ACCESS PANEL            |
| 640   | PWO3M          | FLAT WASHER 6MM                    |
| 641   | PCAP01M        | CAP SCREW M6-1 X 16                |
| 642   | PCAP14M        | CAP SCREW M8-1.25 X 20             |
| 643   | PWO1M          | FLAT WASHER 8MM                    |
| 644   | PNO3M          | HEX NUT M8-1.25                    |
| 645   | PSB10530645    | ELECTRICAL CABINET                 |
| 646   | PNO1M          | HEX NUT M6-1                       |

# Saddle & Cross Slide 1



# Saddle & Cross Slide 2

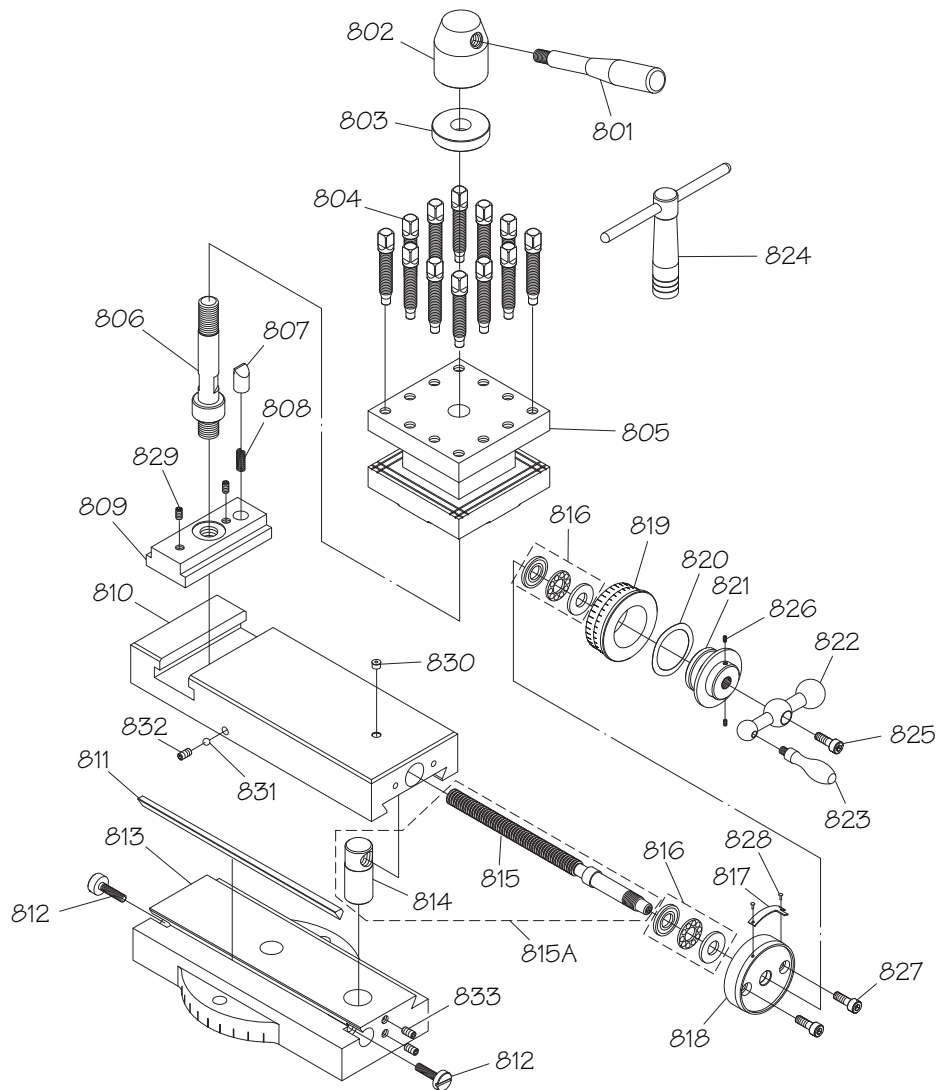


# Saddle & Cross Slide Parts List

| REF  | PART #       | DESCRIPTION                        |
|------|--------------|------------------------------------|
| 701  | PSB10530701  | GIB ADJUSTMENT SCREW               |
| 702  | PSB10530702  | CROSS SLIDE                        |
| 703  | PSB10530703  | COMPOUND SLIDE PIVOT PIN           |
| 704  | PSB10530704  | COMPOUND SLIDE T-BOLT              |
| 705  | PSB10530705  | CROSS SLIDE GIB                    |
| 706  | PSB10530706  | CROSS SLIDE WIPER                  |
| 707  | PSB10530707  | WIPER PLATE                        |
| 708  | PSB10530708  | THRUST BEARING NTB/AS2 1226        |
| 709  | PSB10530709  | BEARING SEAT                       |
| 710  | PSB10530710  | SPACER                             |
| 711  | PSB10530711  | HALF NUT WEDGE                     |
| 712  | PSB10530713A | CROSS SLIDE HALF NUT               |
| 713A | PSB10530713A | CROSS SLIDE LEADSCREW W/HALF NUT   |
| 713  | PSB10530713A | CROSS SLIDE LEADSCREW              |
| 714  | PK165M       | KEY 3 X 3 X 100                    |
| 715  | PRP28M       | ROLL PIN 5 X 40                    |
| 716  | PSB10530716  | COOLANT NOZZLE 3/8" PT X 24"       |
| 717  | PSB10530717  | COOLANT STAND PIPE W/VALVE 3/8" PT |
| 718  | PSB10530718  | STAND PIPE BRACKET                 |
| 719  | PSB10530719  | SADDLE                             |
| 720  | PSB10530720  | SADDLE STRAIGHT WIPER              |
| 721  | PSB10530721  | STRAIGHT WIPER PLATE               |
| 722  | PSB10530001  | OIL FILL CAP                       |
| 723  | PSB10530723  | TAPER PIN #6 X 2-3/4"              |
| 724  | PSB10530724  | SADDLE V-WIPER                     |
| 725  | PSB10530725  | V-WIPER PLATE                      |
| 726  | PSB10530726  | PINION                             |
| 727  | PSB10530727  | PINION BRACKET                     |
| 728  | PSTB001      | STEEL BALL 1/4                     |
| 729  | PSB10530729  | COMPRESSION SPRING 6 X 15          |
| 730  | PSB10530730  | THRUST BEARING NTB/AS2 1730        |
| 731  | PSB10530731  | BRACKET END CAP                    |
| 732  | PSB10530732  | GRADUATED DIAL RING                |
| 733  | PSB10530733  | CROSS SLIDE GRADUATED DIAL         |
| 734  | PSB10530734  | CROSS SLIDE HANDWHEEL              |
| 735  | PSB10530735  | HANDWHEEL END CAP M12-1.75         |

| REF | PART #      | DESCRIPTION                      |
|-----|-------------|----------------------------------|
| 736 | PSB10530736 | HANDWHEEL HANDLE                 |
| 737 | PSB10530737 | HANDLE CAP SCREW                 |
| 738 | PSB10530738 | CARRIAGE GIB                     |
| 739 | PSB10530739 | REAR CARRIAGE GIB CLAMP          |
| 740 | PSB10530740 | FRONT CARRIAGE GIB CLAMP         |
| 741 | PSB10530741 | GEAR FLAT WASHER                 |
| 742 | PSB10530742 | GEAR 16T                         |
| 743 | PSB10530743 | GEAR SHAFT                       |
| 744 | PSB10530744 | PIPE ADAPTER 1/8" PT X 4MM       |
| 745 | PSB10530745 | OIL TUBE 4 X 260MM               |
| 746 | PSB10530746 | PIPE ELBOW ADAPTER 1/8" PT X 4MM |
| 747 | PSB10530747 | OIL TUBE 4 X 120MM               |
| 748 | PSB10530748 | OIL FILTER 6MM                   |
| 749 | PSB10530749 | OIL TUBE 6 X 160MM               |
| 750 | PSB10530750 | PIPE ADAPTER 1/8" PT X 6MM       |
| 751 | PSB10530751 | OIL PUMP ASSEMBLY                |
| 752 | PSB10530752 | CLAMP PLATE                      |
| 753 | PSB10530753 | OIL PUMP FRONT PANEL             |
| 754 | PLUBE001    | TAP-IN BALL OILER 1/4            |
| 755 | PS528M      | SET SCREW M6-1 X 30              |
| 756 | PCAP07M     | CAP SCREW M6-1 X 30              |
| 757 | PNO2M       | HEX NUT M10-1.5                  |
| 758 | PWO4M       | FLAT WASHER 10MM                 |
| 759 | PS08M       | PHLP HD SCR M5-.8 X 12           |
| 760 | PCAP06M     | CAP SCREW M6-1 X 25              |
| 761 | PNO2M       | HEX NUT M10-1.5                  |
| 762 | PCAP195M    | CAP SCREW M6-1 X 20 CHROME       |
| 763 | PCAP35M     | CAP SCREW M8-1.25 X 60           |
| 764 | PS503M      | SET SCREW M6-1 X 8               |
| 765 | PCAP17M     | CAP SCREW M4-.7 X 10             |
| 766 | PCAP02M     | CAP SCREW M6-1 X 20              |
| 767 | PCAP02M     | CAP SCREW M6-1 X 20              |
| 768 | PCAP24M     | CAP SCREW M5-.8 X 16             |
| 769 | PS574M      | SET SCREW M8-1.25 X 35           |
| 770 | PCAP169M    | CAP SCREW M12-1.75 X 75          |

# Compound Slide & Tool Post

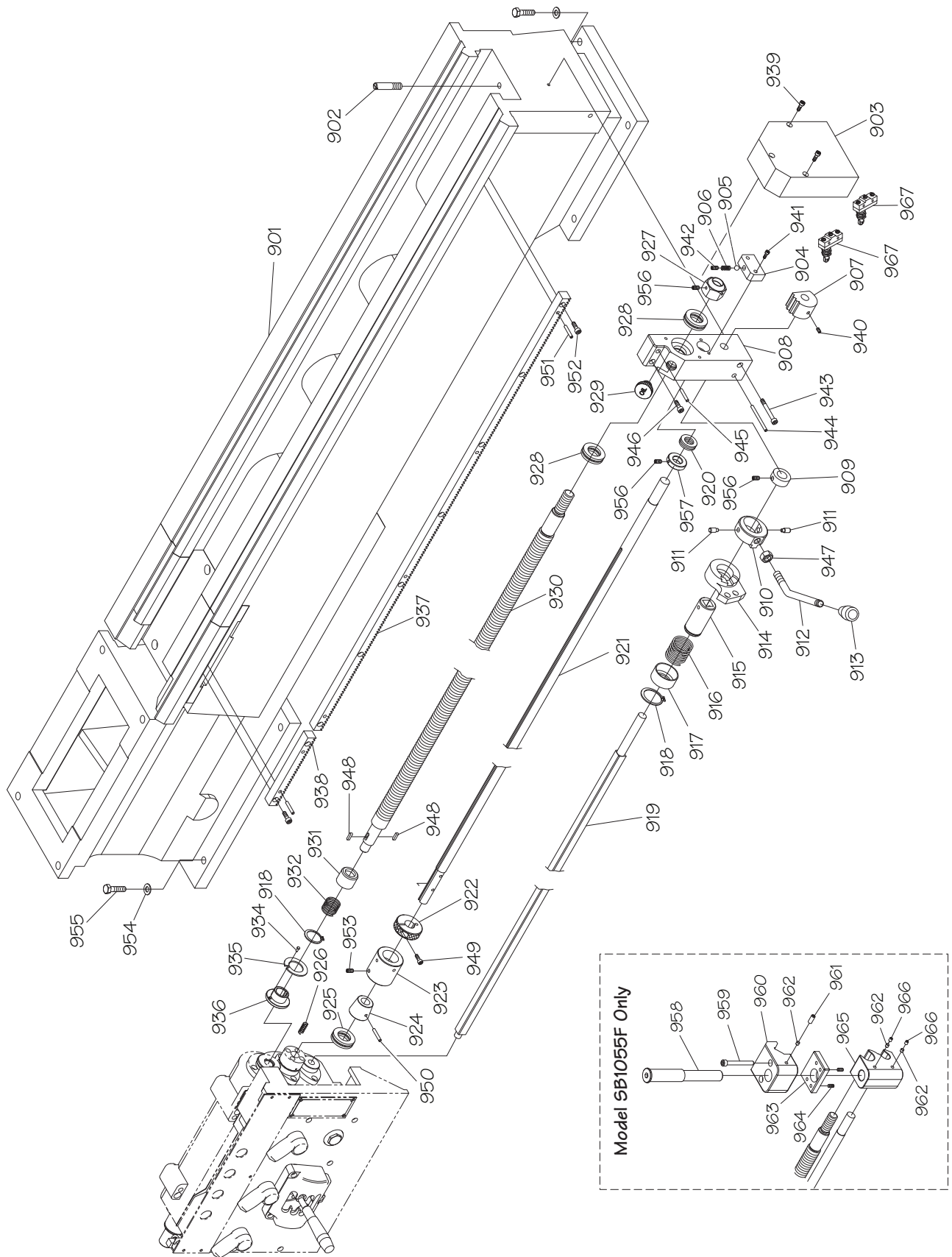


| REF  | PART #       | DESCRIPTION                    |
|------|--------------|--------------------------------|
| 801  | PSB10530801  | TOOL POST LEVER                |
| 802  | PSB10530802  | POST NUT                       |
| 803  | PSB10530803  | POST FLAT WASHER               |
| 804  | PSB10530804  | TOOL CLAMP BOLT                |
| 805  | PSB10530805  | TOOL POST BODY                 |
| 806  | PSB10530806  | TOOL POST                      |
| 807  | PSB10530807  | PLUNGER                        |
| 808  | PSB10530808  | COMPRESSION SPRING 6 X 27      |
| 809  | PSB10530809  | TOOL POST T-SLIDE              |
| 810  | PSB10530810  | COMPOUND SLIDE                 |
| 811  | PSB10530811  | COMPOUND SLIDE GIB             |
| 812  | PSB10530812  | GIB ADJUSTMENT SCREW           |
| 813  | PSB10530813  | COMPOUND SLIDE SWIVEL BASE     |
| 814  | PSB10530815A | COMPOUND SLIDE LEADSCREW NUT   |
| 815A | PSB10530815A | COMPOUND SLIDE LEADSCREW W/NUT |
| 815  | PSB10530815A | COMPOUND SLIDE LEADSCREW       |
| 816  | P51101       | THRUST BEARING 51101           |

| REF | PART #      | DESCRIPTION                   |
|-----|-------------|-------------------------------|
| 817 | PSB10530817 | GRADUATED DIAL POINTER        |
| 818 | PSB10530818 | LEADSCREW BRACKET             |
| 819 | PSB10530819 | COMPOUND SLIDE GRADUATED DIAL |
| 820 | PSB10530820 | WAVY WASHER 35 X 45 X 0.3MM   |
| 821 | PSB10530821 | HANDLE HUB                    |
| 822 | PSB10530822 | BALL HANDLE                   |
| 823 | PSB10530823 | HANDLE                        |
| 824 | PSB10530824 | TOOL POST WRENCH              |
| 825 | PCAP01M     | CAP SCREW M6-1 X 16           |
| 826 | PS504M      | SET SCREW M6-1 X 12           |
| 827 | PCAP26M     | CAP SCREW M6-1 X 12           |
| 828 | PRIV001M    | STEEL FLUTED RIVET 2 X 5MM    |
| 829 | PS514M      | SET SCREW M8-1.25 X 12        |
| 830 | PLUBE001    | TAP-IN BALL OILER 1/4         |
| 831 | PSTB001     | STEEL BALL 1/4                |
| 832 | PS514M      | SET SCREW M8-1.25 X 12        |
| 833 | PS503M      | SET SCREW M6-1 X 8            |



# Bed & Shafts

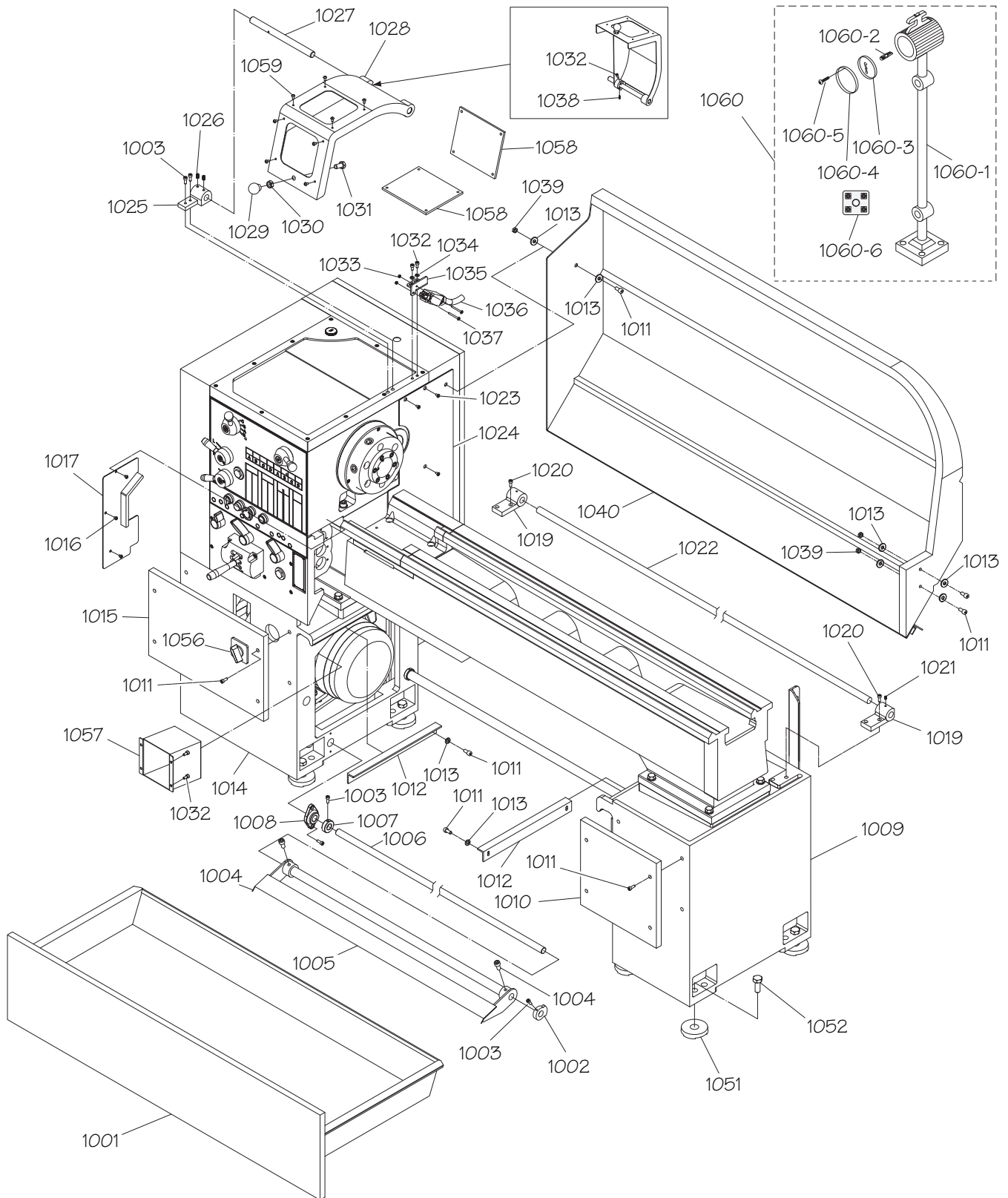


# Bed & Shafts Parts List

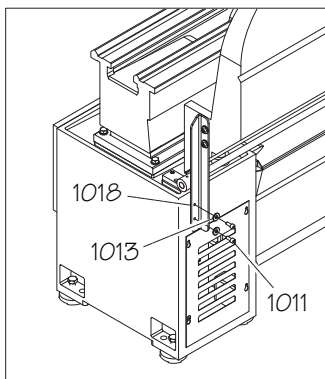
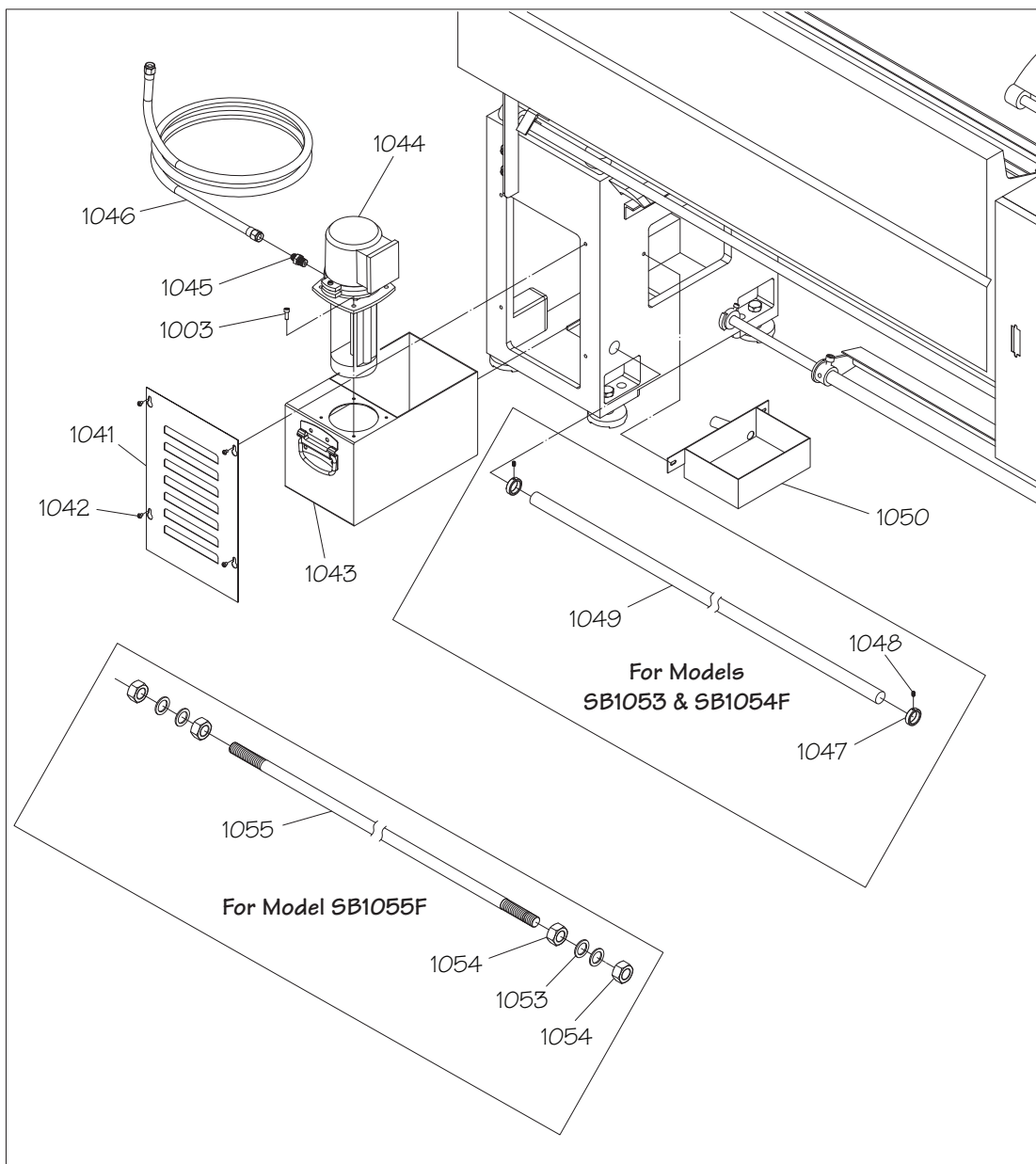
| REF | PART #       | DESCRIPTION                         |
|-----|--------------|-------------------------------------|
| 901 | PSB10530901  | BED (SB1053)                        |
| 901 | PSB10540901  | BED (SB1054F)                       |
| 901 | PSB1055F0901 | BED (SB1055F)                       |
| 902 | PSB10530902  | CARRIAGE STOP BOLT                  |
| 903 | PSB10530903  | SHAFT END BRACKET COVER             |
| 904 | PSB10530904  | RATCHET STOP                        |
| 905 | PSTB002      | STEEL BALL 5/16                     |
| 906 | PSB10530906  | COMPRESSION SPRING 8 X 23           |
| 907 | PSB10530907  | RATCHET COLLAR                      |
| 908 | PSB10530908  | SHAFT END BRACKET                   |
| 909 | PSB10530909  | LOCK COLLAR                         |
| 910 | PSB10530910  | SPINDLE ON/OFF LEVER HUB            |
| 911 | PSB10530911  | HUB STEP PIN                        |
| 912 | PSB10530912  | SPINDLE ON/OFF LEVER                |
| 913 | PSB10530913  | LEVER KNOB                          |
| 914 | PSB10530914  | SPINDLE ROD BRACKET                 |
| 915 | PSB10530915  | SPINDLE ROD SLEEVE                  |
| 916 | PSB10530916  | COMPRESSION SPRING 38 X 75          |
| 917 | PSB10530917  | SPRING HOUSING                      |
| 918 | PR37M        | EXT RETAINING RING 32MM             |
| 919 | PSB10530919  | SPINDLE ROD (SB1053-54F)            |
| 919 | PSB1055F0919 | SPINDLE ROD (SB1055F)               |
| 920 | PSB10530920  | THRUST BEARING NTB/AS2 1831         |
| 921 | PSB10530921  | FEED ROD (SB1053-54F)               |
| 921 | PSB1055F0921 | FEED ROD (SB1055F)                  |
| 922 | PSB10530922  | FEED ROD STOP COLLAR                |
| 923 | PSB10530923  | CLUTCH COLLAR                       |
| 924 | PSB10530924  | TAPERED BUSHING                     |
| 925 | P51203       | THRUST BEARING 51203                |
| 926 | PSB10530926  | COMPRESSIONS SPRING 9 X 32          |
| 927 | PSB10530927  | LEADSCREW LOCK COLLAR               |
| 928 | P51105       | THRUST BEARING 51105                |
| 929 | PSB10530001  | OIL FILL CAP                        |
| 930 | PSB10530930  | LONGITUDINAL LEADSCREW (SB1053-54F) |
| 930 | PSB1055F0930 | LONGITUDINAL LEADSCREW (SB1055F)    |
| 931 | PSB10530931  | SPRING COVER                        |
| 932 | PSB10530932  | COMPRESSION SPRING 27 X 55          |

| REF | PART #       | DESCRIPTION                      |
|-----|--------------|----------------------------------|
| 934 | PSB10530934  | SHEAR PIN (SB1053)               |
| 934 | PSB10360927  | SHEAR PIN (SB1054F-55F)          |
| 935 | PSB10530935  | SHROUD COLLAR                    |
| 936 | PSB10530936  | COLLAR                           |
| 937 | PSB10530937  | RACK (SB1053-54F)                |
| 937 | PSB1055F0937 | RACK (SB1055F)                   |
| 938 | PSB10530938  | GAP RACK (SB1053-54F)            |
| 938 | PSB1055F0938 | GAP RACK (SB1055F)               |
| 939 | PCAP83M      | CAP SCREW M6-1 X 55              |
| 940 | PSS11M       | SET SCREW M6-1 X 16              |
| 941 | PCAP06M      | CAP SCREW M6-1 X 25              |
| 942 | PSS30M       | SET SCREW M10-1.5 X 10           |
| 943 | PCAP128M     | CAP SCREW M8-1.25 X 70           |
| 944 | PSB10530944  | TAPER PIN #7 X 3-1/4"            |
| 945 | PSB10530945  | TAPER PIN #7 X 2"                |
| 946 | PCAP40M      | CAP SCREW M8-1.25 X 35           |
| 947 | PNO9M        | HEX NUT M12-1.75                 |
| 948 | PK20M        | KEY 5 X 5 X 15                   |
| 949 | PCAP02M      | CAP SCREW M6-1 X 20              |
| 950 | PSB10530950  | TAPER PIN #4 X 30                |
| 951 | PRP93M       | ROLL PIN 6 X 25                  |
| 952 | PCAP02M      | CAP SCREW M6-1 X 20              |
| 953 | PSS02M       | SET SCREW M6-1 X 6               |
| 954 | PW06M        | FLAT WASHER 12MM                 |
| 955 | PB187M       | HEX BOLT M12-1.75 X 45 BLK C12.9 |
| 956 | PSS03M       | SET SCREW M6-1 X 8               |
| 957 | PSB10530957  | LOCK COLLAR                      |
| 958 | PSB1055F958  | STEP SHAFT                       |
| 959 | PCAP13M      | CAP SCREW M8-1.25 X 30           |
| 960 | PSB1055F960  | BED CLAMP                        |
| 961 | PSS09M       | SET SCREW M8-1.25 X 20           |
| 962 | PSB1055F962  | PLUNGER                          |
| 963 | PSB1055F963  | LOWER CLAMP PLATE                |
| 964 | PSS06M       | SET SCREW M8-1.25 X 16           |
| 965 | PSB1055F965  | SHAFT SUPPORT                    |
| 966 | PSS20M       | SET SCREW M8-1.25 X 8            |
| 967 | PSB10530967  | SPINDLE SWITCH                   |

# Cabinet Stands & Panels 1



# Cabinet Stands & Panels 2

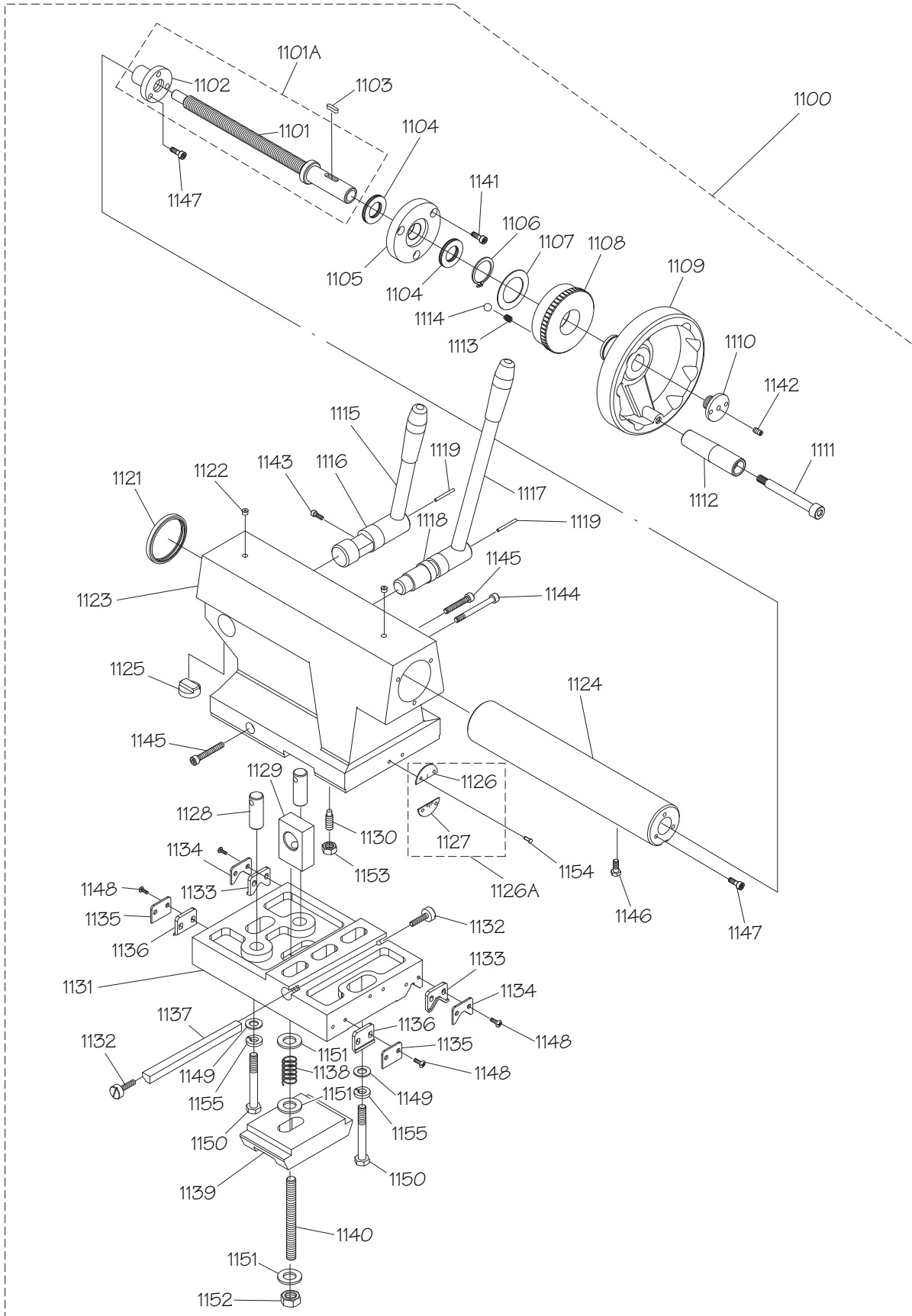


# Cabinet Stands & Panels Parts List

| REF  | PART #       | DESCRIPTION                        |
|------|--------------|------------------------------------|
| 1001 | PSB10531001  | CHIP DRAWER (SB1053-54F)           |
| 1001 | PSB1055F1001 | CHIP DRAWER (SB1055F)              |
| 1002 | PSB10531002  | ECCENTRIC LOCK COLLAR              |
| 1003 | PCAP85M      | CAP SCREW M6-1 X 6                 |
| 1004 | PB56M        | CAP SCREW M10-1.5 X 20             |
| 1005 | PSB10531005  | BRAKE PEDAL (SB1053-54F)           |
| 1005 | PSB1055F1005 | BRAKE PEDAL (SB1055F)              |
| 1006 | PSB10531006  | BRAKE PEDAL ROD (SB1053-54F)       |
| 1006 | PSB1055F1006 | BRAKE PEDAL ROD (SB1055F)          |
| 1007 | PSB10531007  | LOCK COLLAR                        |
| 1008 | PSB10531008  | ROD BRACKET                        |
| 1009 | PSB10531009  | RIGHT CABINET STAND                |
| 1010 | PSB10531010  | RIGHT CABINET FRONT PANEL          |
| 1011 | PCAP196M     | CAP SCREW M8-1.25 X 25 CHROME      |
| 1012 | PSB10531012  | CHIP DRAWER SUPPORT                |
| 1013 | PWO1M        | FLAT WASHER 8MM                    |
| 1014 | PSB10531014  | LEFT CABINET STAND                 |
| 1015 | PSB10531015  | LEFT CABINET FRONT PANEL           |
| 1016 | PSO5M        | PHLP HD SCR M5-.8 X 8              |
| 1017 | PSB10531017  | FEED ROD CLUTCH SIDE COVER         |
| 1018 | PSB10531018  | BACK SPLASH SUPPORT                |
| 1019 | PSB10531019  | ROD BRACKET                        |
| 1020 | PCAP195M     | CAP SCREW M6-1 X 20 CHROME         |
| 1021 | PSS01M       | SET SCREW M6-1 X 10                |
| 1022 | PSB10531022  | BACK SPLASH ROD (SB1053-54F)       |
| 1022 | PSB1055F1022 | BACK SPLASH ROD (SB1055F)          |
| 1023 | PFH71M       | FLAT HD CAP SCR M5-.8 X 8          |
| 1024 | PSB10531024  | HEADSTOCK SIDE COVER (SB1053)      |
| 1024 | PSB1054F1024 | HEADSTOCK SIDE COVER (SB1054F-55F) |
| 1025 | PSB10531025  | CHUCK GUARD PIVOT BRACKET          |
| 1026 | PSS14M       | SET SCREW M8-1.25 X 12             |
| 1027 | PSB10531027  | CHUCK GUARD PIVOT ROD              |
| 1028 | PSB10531028  | CHUCK GUARD                        |
| 1029 | PSB10531029  | KNOB 1/2-13                        |
| 1030 | PN06         | HEX NUT 1/2-13                     |
| 1031 | PB107        | HEX BOLT 1/2-20 X 1 BLK            |
| 1032 | PCAP26M      | CAP SCREW M6-1 X 12                |

| REF    | PART #        | DESCRIPTION                               |
|--------|---------------|---|
| 1033   | PN04M         | HEX NUT M4-.7                             |
| 1034   | PLW03M        | LOCK WASHER 6MM                           |
| 1035   | PSB10531035   | LIMIT SWITCH BRACKET                      |
| 1036   | PSB10531036   | CHUCK GUARD LIMIT SWITCH TZ9212           |
| 1037   | PS40M         | PHLP HD SCR M5-.8 X 16                    |
| 1038   | PSS34M        | SET SCREW M5-.8 X 16                      |
| 1039   | PN03M         | HEX NUT M8-1.25                           |
| 1040   | PSB10531040   | BACK SPLASH (SB1053-54F)                  |
| 1040   | PSB1055F1040  | BACK SPLASH (SB1055F)                     |
| 1041   | PSB10531041   | COOLANT PUMP ACCESS PANEL                 |
| 1042   | PS68M         | PHLP HD SCR M6-1 X 10                     |
| 1043   | PSB10531043   | COOLANT TANK 11.3 LITER                   |
| 1044   | PSB10531044   | COOLANT PUMP 1/8HP 220V 3PH (SB1053)      |
| 1044   | PSB1054F1044  | COOLANT PUMP 1/8HP 440V 3PH (SB1054F-55F) |
| 1045   | PSB10531045   | PIPE NIPPLE 3/8" PT X 3/8" PH             |
| 1046   | PSB10531046   | COOLANT HOSE 3/8" X 72" (SB1053)          |
| 1046   | PSB10531046   | COOLANT HOSE 3/8" X 72" (SB1054F)         |
| 1046   | PSB1055F1046  | COOLANT HOSE 3/8" X 78" (SB1055F)         |
| 1047   | PSB10531047   | LOCK COLLAR                               |
| 1048   | PSS03M        | SET SCREW M6-1 X 8                        |
| 1049   | PSB10531049   | CABINET STAND SUPPORT ROD                 |
| 1050   | PSB10531050   | COOLANT CATCH TRAY                        |
| 1051   | PSB10531051   | LEVELING PAD                              |
| 1052   | PB188M        | HEX BOLT M16-2 X 60 BLK C12.9             |
| 1053   | PSB1055F1053  | SUPPORT ROD FLAT WASHER                   |
| 1054   | PN43          | HEX NUT 1-12                              |
| 1055   | PSB1055F1058  | CABINET STAND SUPPORT ROD                 |
| 1056   | PSB10531056   | 2-SPEED MOTOR SWITCH                      |
| 1057   | PSB10531057   | SWITCH BOX                                |
| 1058   | PSB10531058   | CHUCK GUARD CLEAR PANEL                   |
| 1059   | PS14M         | PHLP HD SCR M6-1 X 12                     |
| 1060   | PSB10531060   | HALOGEN LAMP ASSEMBLY                     |
| 1060-1 | PSB10531060-1 | LAMP BODY                                 |
| 1060-2 | PBULB3        | HALOGEN BULB 24V                          |
| 1060-3 | PSB10531060-3 | LENS                                      |
| 1060-4 | PSB10531060-4 | LENS RETAINER                             |
| 1060-5 | PSS5M         | PHLP HD SCR M3-.5 X 10                    |
| 1060-6 | PSB10531060-6 | LAMP TERMINAL BLOCK 2P                    |

# Tailstock

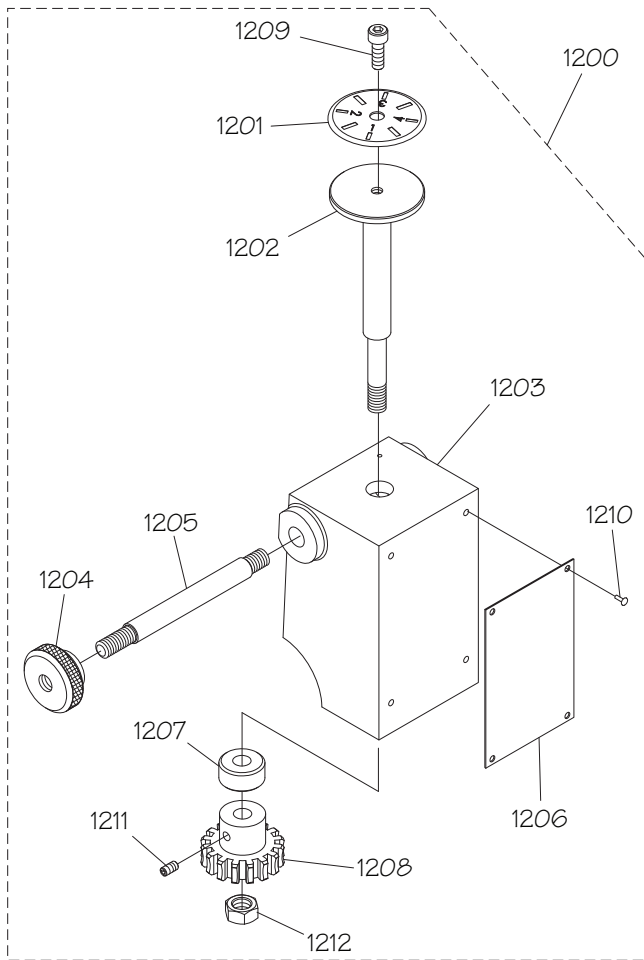


# Tailstock Parts List

| REF   | PART #       | DESCRIPTION                      |
|-------|--------------|----------------------------------|
| 1100  | PSB10531100  | TAILSTOCK ASSEMBLY (SB1053)      |
| 1100  | PSB1054F1100 | TAILSTOCK ASSEMBLY (SB1054F-55F) |
| 1101A | PSB10531101A | TAILSTOCK LEADSCREW W/NUT        |
| 1101  | PSB10531101  | TAILSTOCK LEADSCREW              |
| 1102  | PSB10531102  | LEADSCREW NUT                    |
| 1103  | PK34M        | KEY 5 X 5 X 20                   |
| 1104  | PSB10531104  | THRUST BEARING MTB/AS2 2035      |
| 1105  | PSB10531105  | LEADSCREW BRACKET                |
| 1106  | PR37M        | EXT RETAINING RING 32MM          |
| 1107  | PSB10531107  | THRUST WASHER                    |
| 1108  | PSB10531108  | GRADUATED DIAL                   |
| 1109  | PSB10531109  | HANDWHEEL                        |
| 1110  | PSB10531110  | HANDWHEEL END CAP                |
| 1111  | PSB10531111  | HANDLE CAP SCREW M8-1.25 X 90    |
| 1112  | PSB10531112  | HANDLE                           |
| 1113  | PSB10531113  | COMPRESSION SPRING 6.2 X 16      |
| 1114  | PSTB001      | STEEL BALL 1/4                   |
| 1115  | PSB10531115  | QUILL LOCK LEVER                 |
| 1116  | PSB10531116  | QUILL LOCK SHAFT                 |
| 1117  | PSB10531117  | TAILSTOCK LOCK LEVER             |
| 1118  | PSB10531118  | TAILSTOCK LOCK SHAFT             |
| 1119  | PRP04M       | ROLL PIN 4 X 24                  |
| 1121  | PSB10531121  | OIL SEAL DH53                    |
| 1122  | PLUBE001     | TAP-IN BALL OILER 1/4            |
| 1123  | PSB10531123  | TAILSTOCK CASTING (SB1053)       |
| 1123  | PSB1054F1123 | TAILSTOCK CASTING (SB1054F-55F)  |
| 1124  | PSB10531124  | QUILL                            |
| 1125  | PSB10531125  | QUILL ALIGNMENT KEY              |
| 1126A | PSB10531126A | OFFSET INDICATOR ASSEMBLY        |
| 1126  | PSB10531126  | UPPER OFFSET INDICATOR           |
| 1127  | PSB10531127  | LOWER OFFSET INDICATOR           |

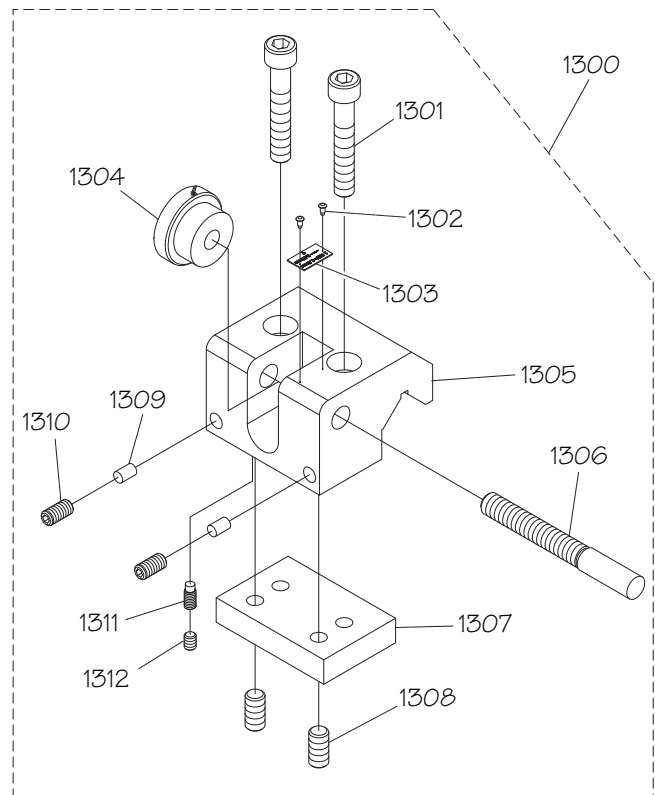
| REF  | PART #       | DESCRIPTION                                |
|------|--------------|--|
| 1128 | PSB10531128  | ALIGNMENT PIN                              |
| 1129 | PSB10531129  | ALIGNMENT BLOCK                            |
| 1130 | PSB10531130  | PILOT SET SCREW M8-1.25 X 25 (SB1053)      |
| 1130 | PSB1054F1130 | PILOT SET SCREW M8-1.25 X 50 (SB1054F-55F) |
| 1131 | PSB10531131  | TAILSTOCK BASE (SB1053)                    |
| 1131 | PSB10531131  | TAILSTOCK BASE (SB1054F-55F)               |
| 1132 | PSB10531132  | GIB ADJUSTMENT SCREW                       |
| 1133 | PSB10531133  | TAILSTOCK V-WIPER                          |
| 1134 | PSB10531134  | V-WIPER PLATE                              |
| 1135 | PSB10531135  | STRAIGHT WIPER PLATE                       |
| 1136 | PSB10531136  | TAILSTOCK STRAIGHT WIPER                   |
| 1137 | PSB10531137  | TAILSTOCK GIB                              |
| 1138 | PSB10531138  | COMPRESSION SPRING 25 X 45                 |
| 1139 | PSB10531139  | CLAMP PLATE                                |
| 1140 | PSB10531140  | STUD-FT M14-2 X 110 (SB1053)               |
| 1140 | PSB1054F1140 | STUD-FT M14-2 X 125 (SB1054F-55F)          |
| 1141 | PCAP01M      | CAP SCREW M6-1 X 16                        |
| 1142 | PSS04M       | SET SCREW M6-1 X 12                        |
| 1143 | PCAP26M      | CAP SCREW M6-1 X 12                        |
| 1144 | PCAP128M     | CAP SCREW M8-1.25 X 70                     |
| 1145 | PCAP35M      | CAP SCREW M8-1.25 X 60                     |
| 1146 | PCAP68M      | CAP SCREW M6-1 X 8                         |
| 1147 | PCAP01M      | CAP SCREW M6-1 X 16                        |
| 1148 | PS08M        | PHLP HD SCR M5-.8 X 12                     |
| 1149 | PSB10531149  | CLAMP FLAT WASHER                          |
| 1150 | PB186M       | HEX BOLT M10-1.5 X 55 BLK                  |
| 1151 | PW10M        | FLAT WASHER 14MM                           |
| 1152 | PN32M        | HEX NUT M14-2                              |
| 1153 | PNO3M        | HEX NUT M8-1.25                            |
| 1154 | PRIV001M     | STEEL FLUTED RIVET 2 X 5MM                 |
| 1155 | PLW06M       | LOCK WASHER 10MM                           |

# Thread Dial



| REF  | PART #      | DESCRIPTION                |
|------|-------------|----------------------------|
| 1200 | PSB10531200 | THREAD DIAL ASSEMBLY       |
| 1201 | PSB10531201 | DIAL INDICATOR             |
| 1202 | PSB10531202 | PIVOT SHAFT                |
| 1203 | PSB10531203 | THREAD DIAL BODY           |
| 1204 | PSB10531204 | KNURLED KNOB               |
| 1205 | PSB10531205 | LOCK STUD-DE               |
| 1206 | PSB10531206 | DIAL CHART PANEL           |
| 1207 | PSB10531207 | SPACER                     |
| 1208 | PSB10531208 | DIAL GEAR 16T              |
| 1209 | PCAP04M     | CAP SCREW M6-1 X 10        |
| 1210 | PRIV001M    | STEEL FLUTED RIVET 2 X 5MM |
| 1211 | PSS02M      | SET SCREW M6-1 X 6         |
| 1212 | PNO3M       | HEX NUT M8-1.25            |

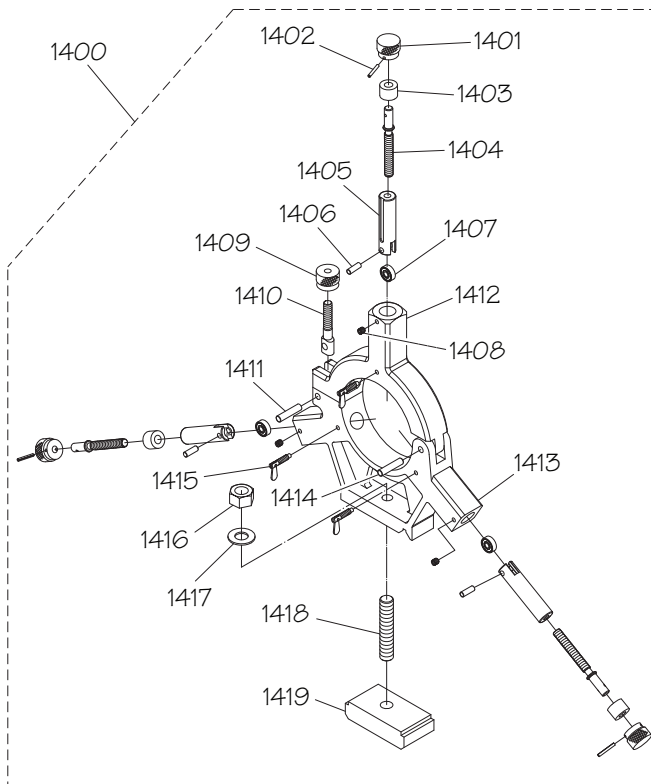
# Micrometer Stop



| REF  | PART #      | DESCRIPTION                  |
|------|-------------|------------------------------|
| 1300 | PSB10531300 | MICROMETER STOP ASSEMBLY     |
| 1301 | PCAP71M     | CAP SCREW M10-1.5 X 60       |
| 1302 | PRIV001M    | STEEL FLUTED RIVET 2 X 5MM   |
| 1303 | PSB10531303 | INDICATOR PLATE              |
| 1304 | PSB10531304 | MICROMETER DIAL              |
| 1305 | PSB10531305 | MICROMETER DIAL BODY         |
| 1306 | PSB10531306 | MICROMETER ROD               |
| 1307 | PSB10531307 | CLAMP PLATE                  |
| 1308 | PSS10M      | SET SCREW M10-1.5 X 20       |
| 1309 | PSB10531309 | PLUNGER COPPER               |
| 1310 | PSS06M      | SET SCREW M8-1.25 X 16       |
| 1311 | PSB10531311 | PILOT SET SCREW M8-1.25 X 12 |
| 1312 | PSS14M      | SET SCREW M8-1.25 X 12       |

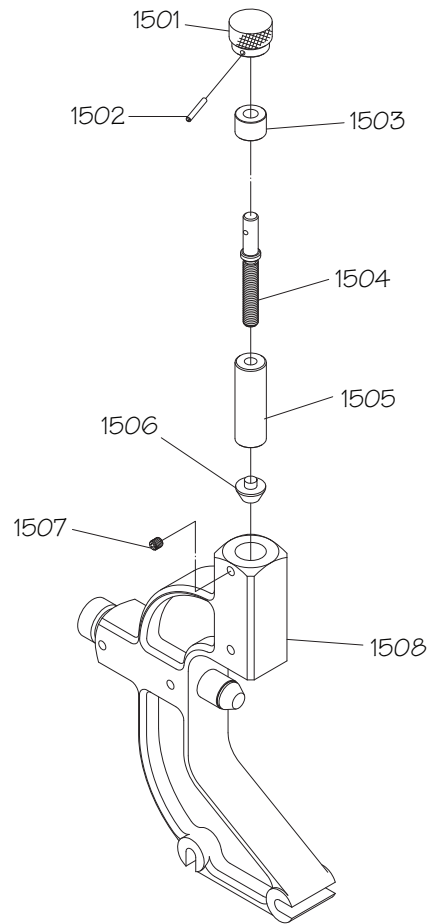


# Steady Rest



| REF  | PART #      | DESCRIPTION            |
|------|-------------|------------------------|
| 1400 | PSB10531400 | STEADY REST ASSEMBLY   |
| 1401 | PSB10531401 | FINGER ADJUSTMENT KNOB |
| 1402 | PRP51M      | ROLL PIN 4 X 40        |
| 1403 | PSB10531403 | SPACER                 |
| 1404 | PSB10531404 | FINGER ADJUSTMENT BOLT |
| 1405 | PSB10531405 | FINGER                 |
| 1406 | PSB10531406 | DOWEL PIN              |
| 1407 | P627ZZ      | BALL BEARING 627ZZ     |
| 1408 | PSS20M      | SET SCREW M8-1.25 X 8  |
| 1409 | PSB10531409 | CLAMP KNOB             |
| 1410 | PSB10531410 | CLAMP SCREW            |
| 1411 | PSB10531411 | DOWEL PIN              |
| 1412 | PSB10531412 | UPPER CASTING          |
| 1413 | PSB10531413 | LOWER CASTING          |
| 1414 | PSB10531414 | HINGE PIN              |
| 1415 | PSB10531415 | DOG POINT LEAF SCREW   |
| 1416 | PNO9M       | HEX NUT M12-1.75       |
| 1417 | PLW05M      | LOCK WASHER 12MM       |
| 1418 | PSB10531418 | STUD-FT M12-1.75 X 75  |
| 1419 | PSB10531419 | CLAMP PLATE            |

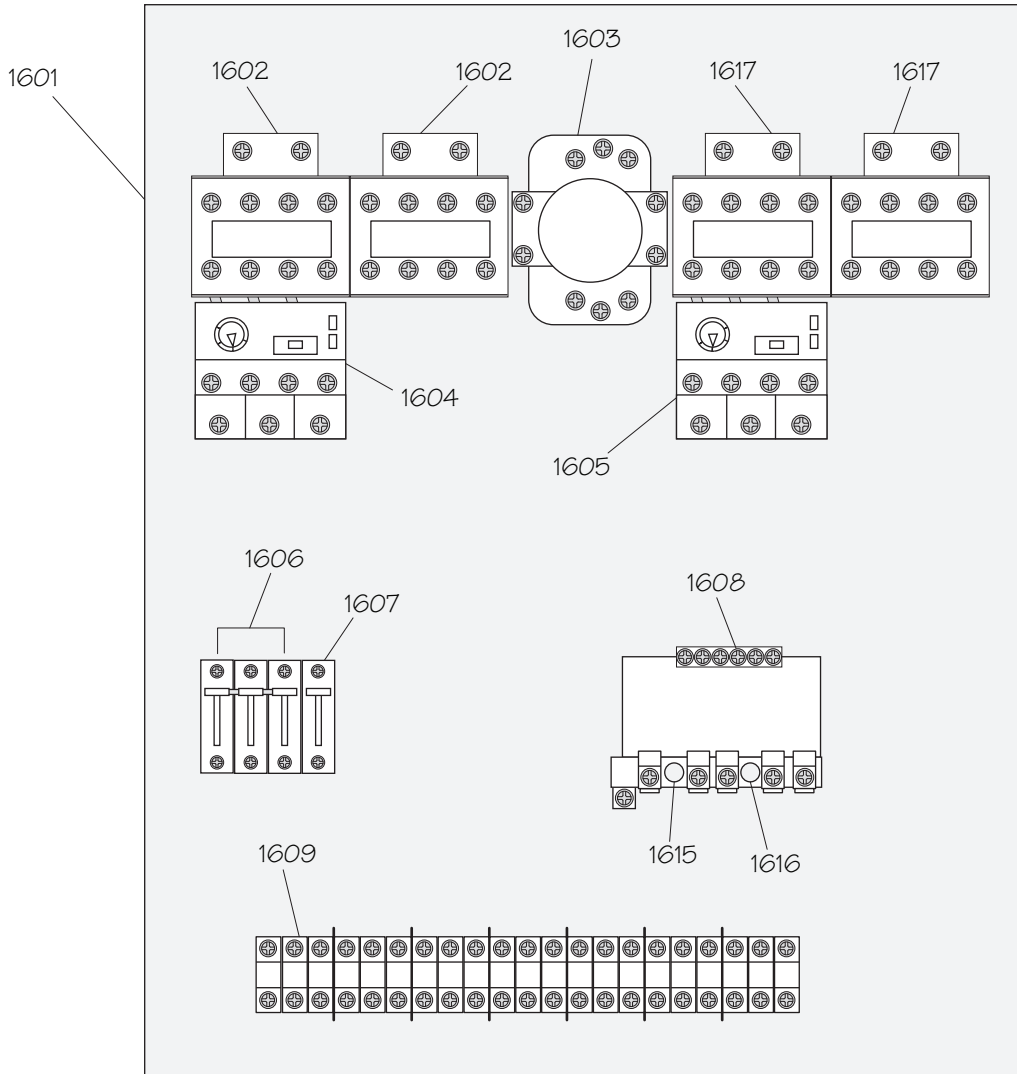
# Follow Rest



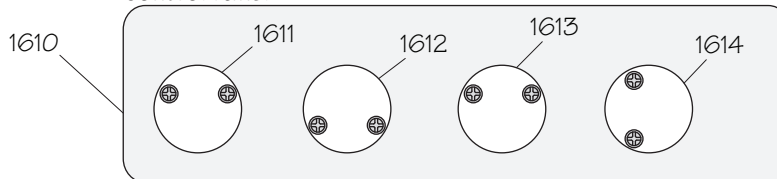
| REF  | PART #      | DESCRIPTION            |
|------|-------------|------------------------|
| 1500 | PSB10531500 | FOLLOW REST ASSEMBLY   |
| 1501 | PSB10531401 | FINGER ADJUSTMENT KNOB |
| 1502 | PRP51M      | ROLL PIN 4 X 40        |
| 1503 | PSB10531403 | SPACER                 |
| 1504 | PSB10531504 | FINGER ADJUSTMENT BOLT |
| 1505 | PSB10531505 | FINGER                 |
| 1506 | PSB10531506 | FINGER TIP             |
| 1507 | PSS20M      | SET SCREW M8-1.25 X 8  |
| 1508 | PSB10531508 | CASTING                |

# Electrical

Electrical Cabinet



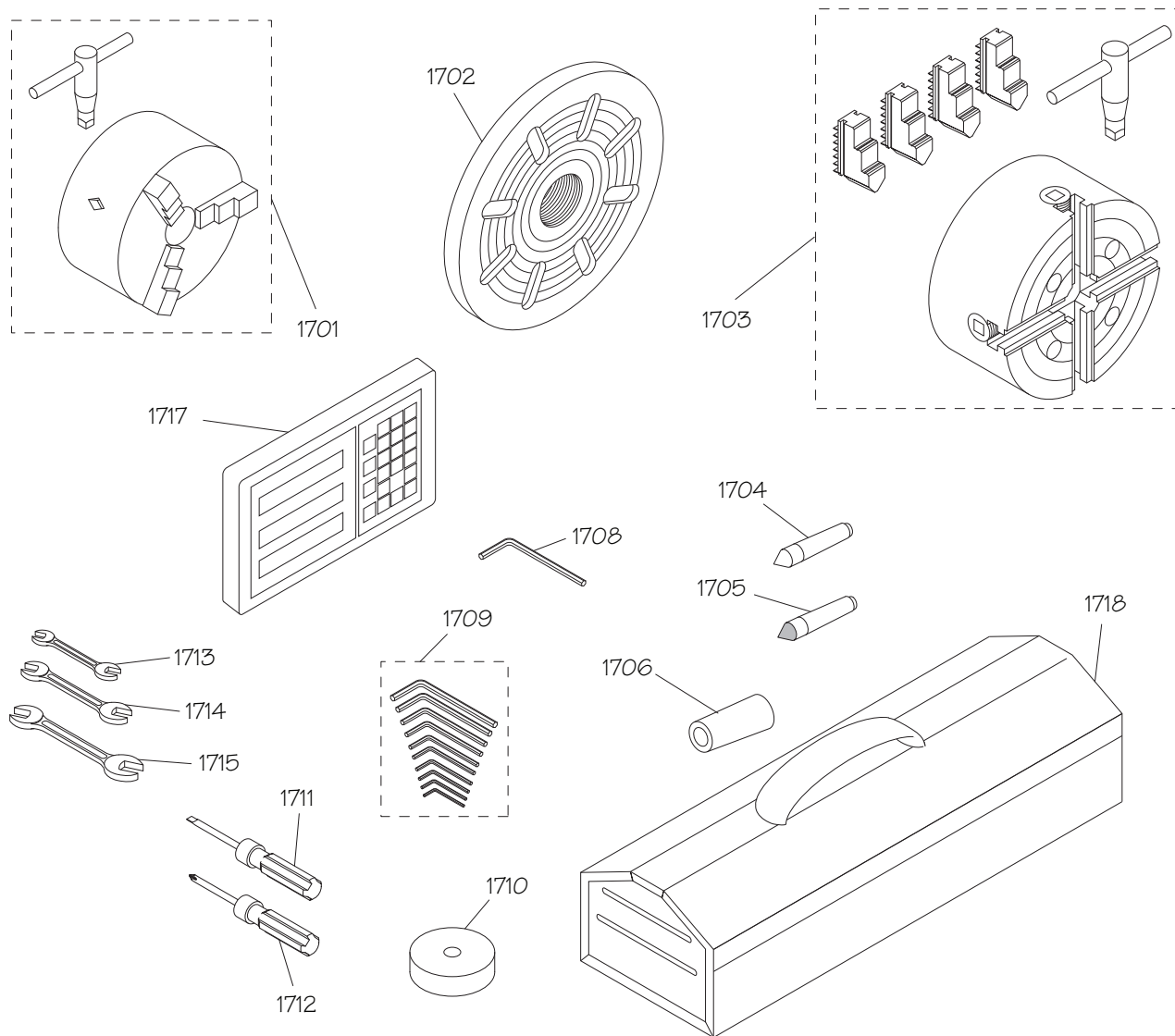
Control Panel



| REF  | PART #       | DESCRIPTION                                   |
|------|--------------|---|
| 1601 | PSB10531601  | ELECTRICAL MOUNTING PLATE                     |
| 1602 | PSB10531602  | CONTACTOR AB C2301 220V (SB1053)              |
| 1602 | PSB1054F1602 | CONTACTOR AB C1601 440V (SB1054F-55F)         |
| 1603 | PSB10531603  | MASTER POWER SWITCH                           |
| 1604 | PSB10531604  | OL RELAY AB 193T 21-25A (SB1053)              |
| 1604 | PSB1054F1604 | OL RELAY AB 193T 16-24A (SB1054F-55F)         |
| 1605 | PSB10531605  | OL RELAY AB 193T 0.25-0.4A                    |
| 1606 | PSB10531606  | CIRCUIT BREAKER 1492 SP D25-25A (SB1053)      |
| 1606 | PSB1054F1606 | CIRCUIT BREAKER 1492 SP D20-20A (SB1054F-55F) |
| 1607 | PSB10531607  | CIRCUIT BREAKER 1492 SP D6-6A                 |

| REF  | PART #      | DESCRIPTION                        |
|------|-------------|------------------------------------|
| 1608 | PSB10531608 | TRANSFORMER LIANG SP-TBSW          |
| 1609 | PSB10531609 | TERMINAL BLOCK 3 POST              |
| 1610 | PSB10531610 | CONTROL PANEL PLATE                |
| 1611 | PSB10531611 | JOG BUTTON                         |
| 1612 | PSB10531612 | EMERGENCY STOP BUTTON              |
| 1613 | PSB10531613 | POWER LAMP                         |
| 1614 | PSB10531614 | CUTTING FLUID SWITCH               |
| 1615 | PSB10531615 | FUSE 4A 250V TIME-DELAY 5 X 20MM   |
| 1616 | PSB10531616 | FUSE 0.5A 250V TIME-DELAY 5 X 20MM |
| 1617 | PSB10531617 | CONTACTOR AB C09400                |

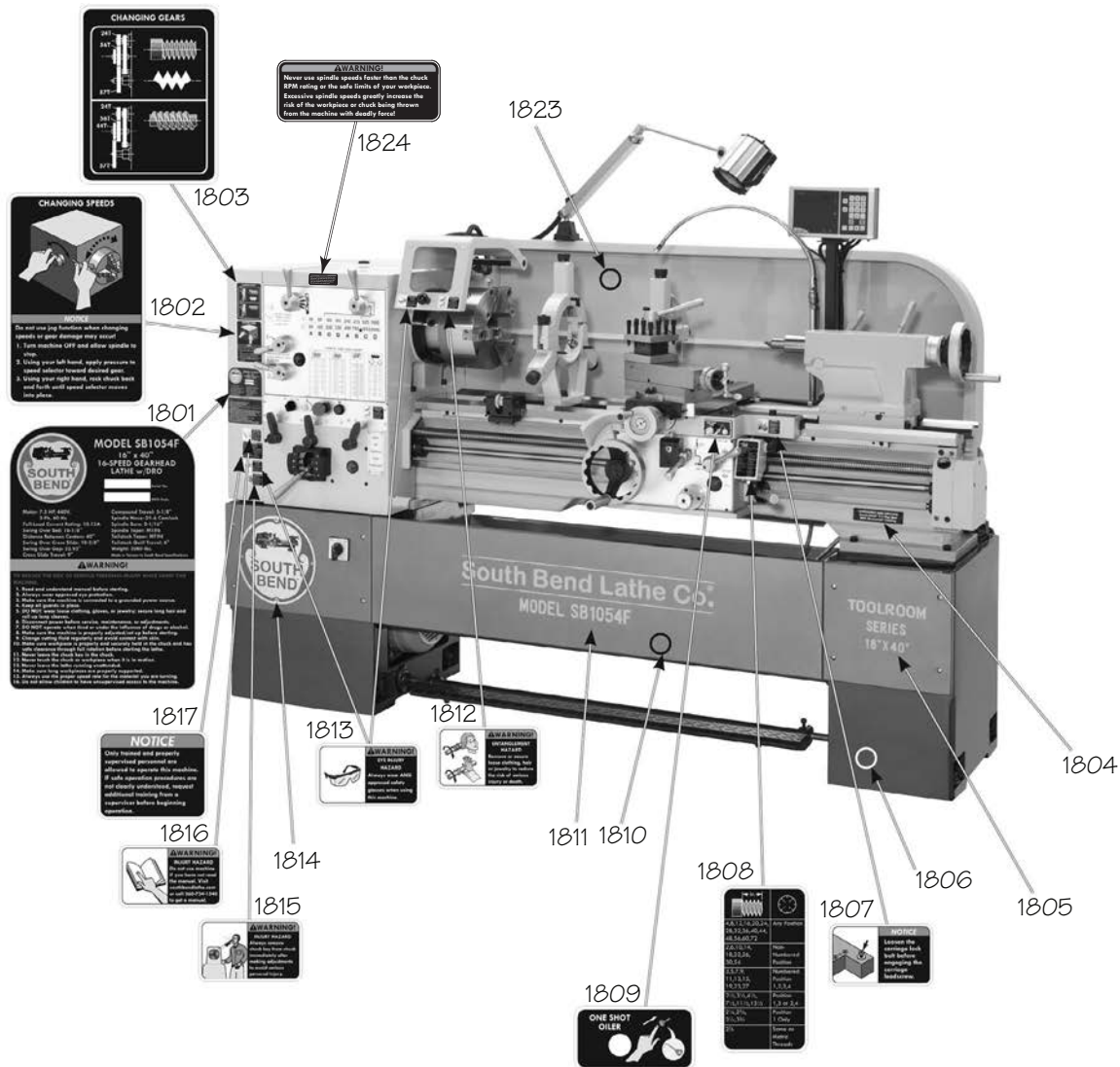
# Accessories



| REF  | PART #      | DESCRIPTION                     |
|------|-------------|---------------------------------|
| 1701 | SB1309      | 3-JAW CHUCK ASSEMBLY 9"         |
| 1702 | PSB10531702 | FACEPLATE ASSEMBLY 12"          |
| 1703 | SB1228      | 4-JAW CHUCK ASSEMBLY 10"        |
| 1704 | PSB10531704 | DEAD CENTER MT#4                |
| 1705 | PSB10531705 | DEAD CENTER CARBIDE-TIPPED MT#4 |
| 1706 | PSB10531706 | SPINDLE SLEEVE MT#6-MT#4        |
| 1707 | PSB10531707 | TOOL BOX                        |
| 1708 | PAW10M      | HEX WRENCH 10MM                 |
| 1709 | PAW1510M    | HEX WRENCH SET 1.5-10MM         |

| REF  | PART #      | DESCRIPTION                     |
|------|-------------|---------------------------------|
| 1710 | PSB10531710 | FOOT CAST-IRON                  |
| 1711 | PSDF2       | STANDARD SCREWDRIVER #2         |
| 1712 | PSDP2       | PHILLIPS SCREWDRIVER #2         |
| 1713 | PWR1012     | WRENCH 10/12MM                  |
| 1714 | PWR1417     | WRENCH 14/17MM                  |
| 1715 | PWR2224     | WRENCH 22/24MM                  |
| 1717 | PSB10531717 | DRO ASSEMBLY FAGOR 20I-T 2-AXIS |
| 1718 | PSB10531718 | TOOL BOX                        |

# Front Machine Labels



| REF  | PART #       | DESCRIPTION                     |
|------|--------------|---------------------------------|
| 1801 | PSB10531801  | MACHINE ID LABEL (SB1053)       |
| 1801 | PSB1054F1801 | MACHINE ID LABEL (SB1054F)      |
| 1801 | PSB1055F1801 | MACHINE ID LABEL (SB1055F)      |
| 1802 | PSB10531802  | CHANGING SPEEDS LABEL           |
| 1803 | PSB10531803  | CHANGING GEARS LABEL            |
| 1804 | PSB10531804  | BEDWAY DESCRIPTION LABEL        |
| 1805 | PSB10531805  | TOOLROOM SERIES LABEL (SB1053)  |
| 1805 | PSB1054F1805 | TOOLROOM SERIES LABEL (SB1054F) |
| 1805 | PSB1055F1805 | TOOLROOM SERIES LABEL (SB1055F) |
| 1806 | PSBPAIN03    | SB DARK BLUE TOUCH-UP PAINT     |
| 1807 | PSB10531807  | CARRIAGE LOCK NOTICE LABEL      |
| 1808 | PSB10531808  | DIAL CHART LABEL                |
| 1809 | PSB10531809  | ONE-SHOT OILER LABEL            |

| REF  | PART #       | DESCRIPTION                       |
|------|--------------|-----------------------------------|
| 1810 | PSBPAIN02    | SB LIGHT BLUE TOUCH-UP PAINT      |
| 1811 | PSB10531811  | LOGO MODEL NUMBER LABEL (SB1053)  |
| 1811 | PSB1054F1811 | LOGO MODEL NUMBER LABEL (SB1054F) |
| 1811 | PSB1055F1811 | LOGO MODEL NUMBER LABEL (SB1055F) |
| 1812 | PSBLABEL08HL | ENTANGLEMENT HAZARD LABEL         |
| 1813 | PSBLABEL04HL | SAFETY GLASSES LABEL              |
| 1814 | SB1322       | SOUTH BEND NAMEPLATE              |
| 1815 | PSB10531815  | CHUCK KEY HAZARD LABEL            |
| 1816 | PSBLABEL01HL | READ MANUAL LABEL                 |
| 1817 | PSB10531817  | PROPER PERSONNEL NOTICE LABEL     |
| 1823 | PSBPAIN01    | SB GRAY TOUCH-UP PAINT            |
| 1824 | PSB10531824  | CHUCK SPEED LABEL                 |

# Rear & Side Machine Labels



| REF  | PART #       | DESCRIPTION                        |
|------|--------------|------------------------------------|
| 1818 | PSBLABEL15M  | ELECTRICITY LABEL                  |
| 1819 | PSBLABEL02HL | DISCONNECT POWER LABEL             |
| 1820 | PSB10531820  | 220V 3PH LABEL (SB1053)            |
| 1820 | PSB1054F1820 | 440V 3PH LABEL (SB1054F & SB1055F) |
| 1821 | PSBLABEL06HL | POISON/BIOHAZARD LABEL             |

| REF  | PART #       | DESCRIPTION                  |
|------|--------------|------------------------------|
| 1822 | PSB10531822  | MACHINE DATA PLATE (SB1053)  |
| 1822 | PSB1054F1822 | MACHINE DATA PLATE (SB1054F) |
| 1822 | PSB1055F1822 | MACHINE DATA PLATE SB1055F)  |
| 1825 | PSB10531825  | FLUID CAPACITIES LABEL       |

**⚠ WARNING**

The safety labels provided with your machine are used to make the operator aware of the machine hazards and ways to prevent injury. The owner of this machine **MUST** maintain the original location and readability of these safety labels. If any label is removed or becomes unreadable, **REPLACE** that label before using the machine again. Contact South Bend Lathe Co. at (360) 734-1540 or [www.southbendlathe.com](http://www.southbendlathe.com) to order new labels.



## **Warranty**

This quality product is warranted by South Bend Lathe Company to the original buyer for one year from the date of purchase. This warranty does not apply to consumable parts, or defects due to any kind of misuse, abuse, negligence, accidents, repairs, alterations or lack of maintenance. We do not reimburse for third party repairs. In no event shall we be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our products.

We do not warrant or represent that this machine complies with the provisions of any law, act, code, regulation, or standard of any domestic or foreign government, industry, or authority. In no event shall South Bend's liability under this warranty exceed the original purchase price paid for this machine. Any legal actions brought against South Bend Lathe Company shall be tried in the State of Washington, County of Whatcom.

This is the sole written warranty for this machine. Any and all warranties that may be implied by law, including any merchantability or fitness, for any purpose, are hereby limited to the duration of this warranty. To take advantage of this warranty, contact us by mail or phone to give us the details of the problem you are having.

Thank you for your business and continued support.



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